

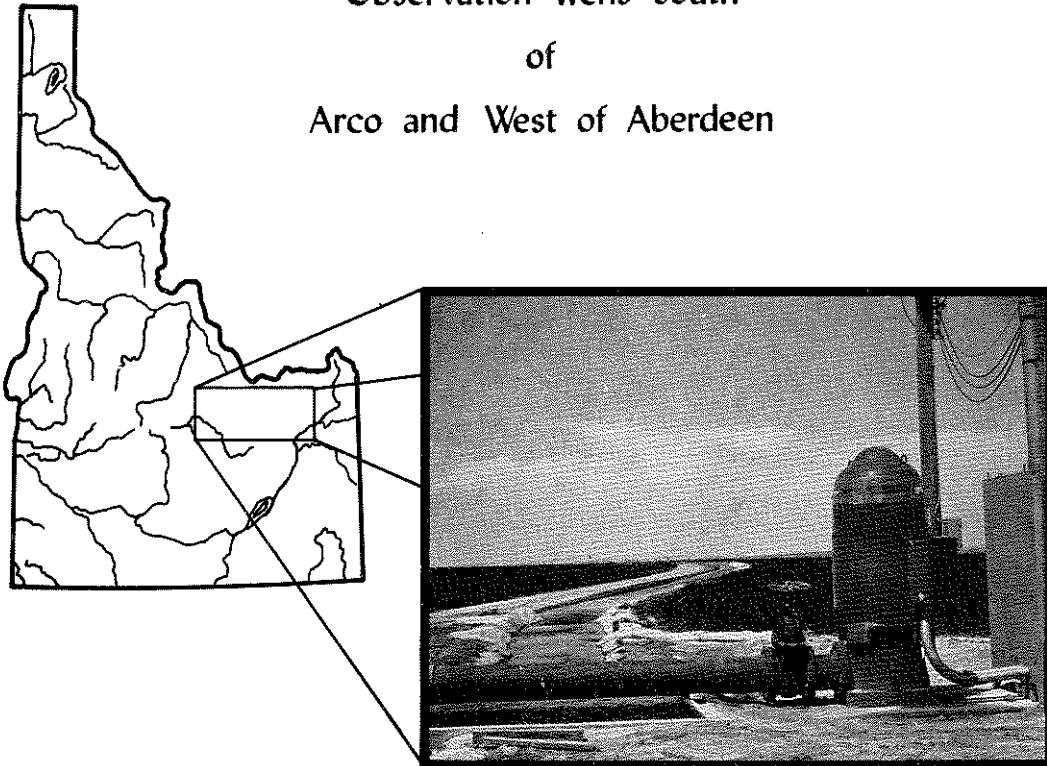
A PROGRESS REPORT ON  
RESULTS OF TEST- DRILLING  
AND  
GROUND - WATER INVESTIGATIONS  
OF THE  
SNAKE PLAIN AQUIFER,  
SOUTHEASTERN IDAHO

PART 1

Mud Lake Region, 1969-70

PART 2

Observation Wells South  
of  
Arco and West of Aberdeen



IDaho DEPARTMENT OF WATER ADMINISTRATION

WATER INFORMATION BULLETIN NO. 32

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RESULTS OF TEST-DRILLING AND GROUND-WATER INVESTIGATIONS  
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**Part 1**

**Mud Lake Region, 1969-70**

**and**

**Part 2**

**Observation Wells South of Arco  
and West of Aberdeen**

**By**

**E. G. Crosthwaite**

**Prepared by the United States Geological Survey**

**in cooperation with**

**Idaho Department of Water Administration**

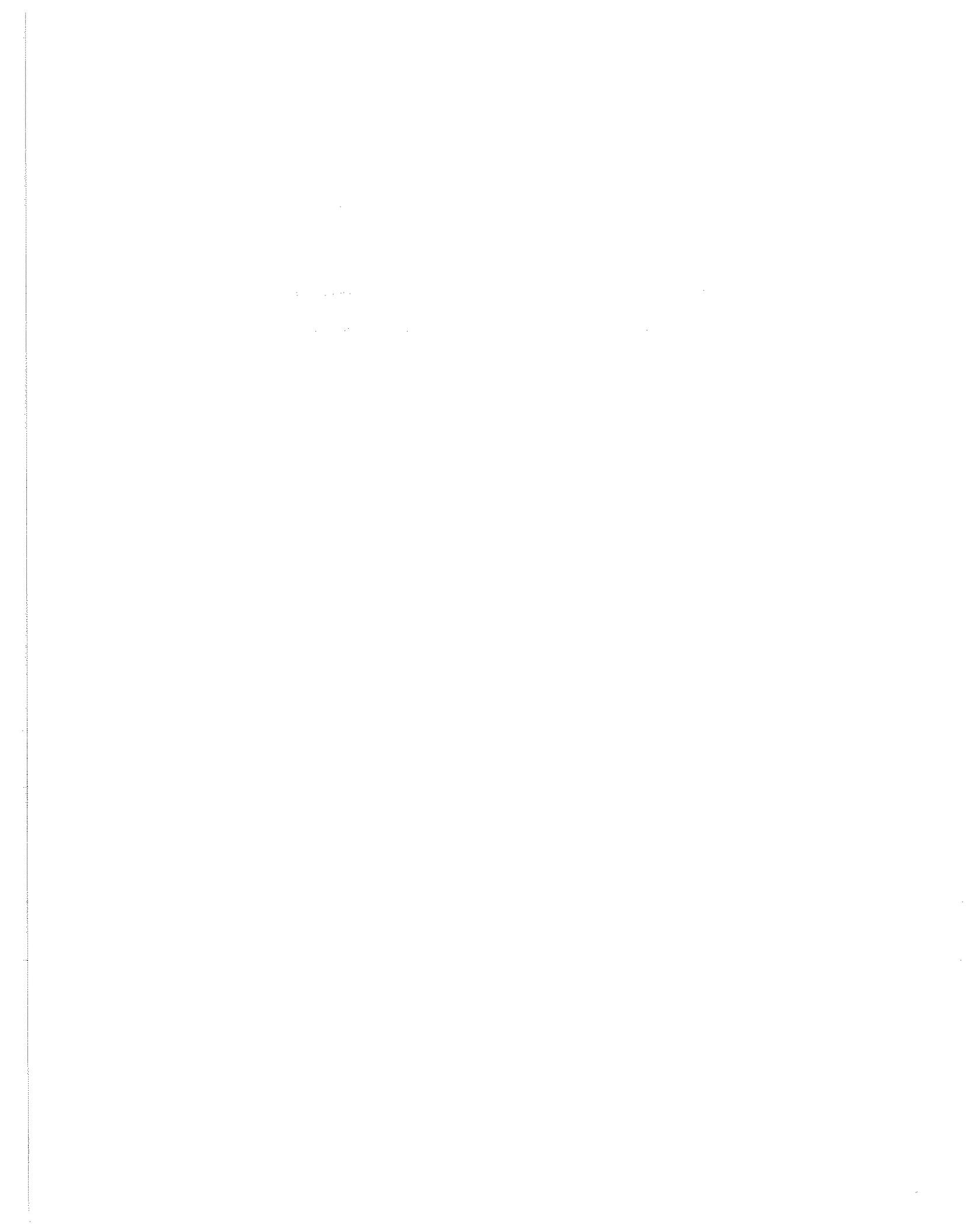
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**PART 1**

**MUD LAKE REGION, 1969-70**

Fig. 1

$$\Delta E = \mu_1 \mu_2 / (2\pi^2) - \mu_1^2 / (2\pi^2) - \mu_2^2 / (2\pi^2)$$

(2)

or

## PREFACE

The Snake Plain aquifer, as defined by Mundorff, Crosthwaite, and Kilburn (1964, p. 142), is a series of basalt flows and intercalated pyroclastic and sedimentary materials that underlies the Snake River Plain east of Bliss (fig. 1). The aquifer is about 9,500 square miles in areal extent and yielded about a million acre-feet of water to wells in 1969. Approximately 6½-million acre-feet of water is recharged annually to this aquifer by seepage loss from the Snake River and its tributaries, by underflow from tributary valleys, by the downward percolation of water applied for irrigation, and by precipitation on the Plain. Water is discharged from the aquifer through springs and by pumping for irrigation, municipal, industrial, stock, and domestic use. Although the aquifer has been extensively studied and its general extent and properties are known, it is so large and thick that data on the distribution of basalt flows and interbedded sedimentary deposits that control the movement of ground water have not been obtained at several places of great current importance. Also, there are large areas where the position of the water table and the potential yield of the aquifer are not known.

The objectives of this investigation are to obtain (1) information descriptive of elevations and fluctuations of the water table, water-table gradients, and the distribution of transmissivity, in areas of the Snake Plain aquifer where data are lacking; (2) details of stratigraphic and hydrologic properties at localities selected as being suitable for pumping large quantities of ground water in exchange for surface water<sup>1</sup>; (3) hydrologic details in the eastern part of this aquifer, where the greatest amount of recharge occurs, so as to interpret better the distribution of recharge to spring discharge areas; and (4) water-level and stratigraphic data in the area of the Mud Lake-Market Lake barrier so as to better define recharge relations and large water-level differentials occurring in and around this barrier. In addition, it is anticipated that all the data collected will be integrated into an existing analog model of the Snake Plain aquifer so that the long-term effects of development of the aquifer can be better predicted.

The Idaho Department of Water Administration has the responsibility of administering the water resources of Idaho, and for this reason it is vitally interested in basic data descriptive of the water resources of the Snake River Plain. Because the U. S. Bureau of Reclamation is actively developing the water resources available in various parts of the Plain, it needs basic data which will be useful in selecting areas suitable for development and in evaluating effects of development. The U. S. Geological Survey has a responsibility for collecting basic data and for appraising the water resources of Idaho. Because of their common interests, and in recognition of the need for information about the water resources of the Snake Plain aquifer, these three agencies entered into a cooperative agreement whereby the U. S. Geological Survey and the U. S. Bureau of Reclamation would initiate, in

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<sup>1</sup> The U. S. Bureau of Reclamation is investigating the feasibility of diverting surface water from presently irrigated land to areas of inadequate surface-water supply or areas of no surface-water supply and replacing the diverted surface water with ground water.

July 1969, a 4-year project whose goal is to satisfy the objectives described above.

To provide for timely release of the data collected during this 4-year project, it is planned that a series of progress reports describing the work accomplished during each phase of the project will be prepared. This report, which describes the work accomplished in the Mud Lake region in the northeastern part of the Snake River Plain during the period July 1969 to July 1970, is the first report of this series.

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**A PROGRESS REPORT ON**  
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**OF THE SNAKE PLAIN AQUIFER, SOUTHEASTERN IDAHO**

**Part 1**

**Mud Lake Region, 1969-70**

**By E. G. Crosthwaite**

**ABSTRACT**

The results of drilling test holes to depths of approximately 1,000 feet in the Mud Lake region show that a large part of the region is underlain by both sedimentary deposits and basalt flows. At some locations, predominantly sedimentary deposits were penetrated; at others, basalt flows predominated. The so-called Mud Lake-Market Lake barrier denotes a change in geology. From the vicinity of the barrier area, as described by Stearns, Crandall, and Steward (1938, p. 111), up the water-table gradient for at least a few tens of miles, the saturated geologic section consists predominantly of beds of sediments that are intercalated with numerous basalt flows. Downgradient from the barrier, sedimentary deposits are not common and practically all the water-bearing formations are basalt, at least to the depths explored so far. Thus, the barrier is a transition zone from a sedimentary-basaltic sequence to a basaltic sequence. The sedimentary-basaltic sequence forms a complex hydrologic system in which water occurs under water-table conditions in the upper few tens of feet of saturated material and under artesian conditions in the deeper material in the southwest part of the region. The well data indicate that southwest of the barrier, artesian pressures are not significant. Southwest of the barrier, few sedimentary deposits occur in the basalt section and, as described by Mundorff, Crosthwaite, and Kilburn (1964), ground water occurs in a manner typical of the Snake Plain aquifer. In several wells, artesian pressures are higher in the deeper formations than in the shallower ones, but the reverse was found in a few wells. The available data are not adequate to describe the water-bearing characteristics of the artesian aquifer nor the effects that pumping in one zone would have on adjacent zones. The water-table aquifer yields large quantities of water to irrigation wells.

Although the Mud Lake region is within the Snake River Plain, the geology and hydrology of the region differs significantly from that of most of the Plain, and for this reason the aquifers in the region should be considered as separate hydrologic units. Geologic sections and a fence diagram show that sediments dominate in the region of the Mud Lake-Market Lake barrier whereas basalts are most common in adjoining areas. Tentative correlations of hydrologic units are shown in the cross sections and fence diagram.

As an aid to continued development of needed ground-water supplies in the Mud Lake region, the water-bearing characteristics of the deep artesian aquifers should be tested and exploration of aquifers occurring at depths greater than those penetrated to date should be undertaken.

## INTRODUCTION

### Purpose and Scope

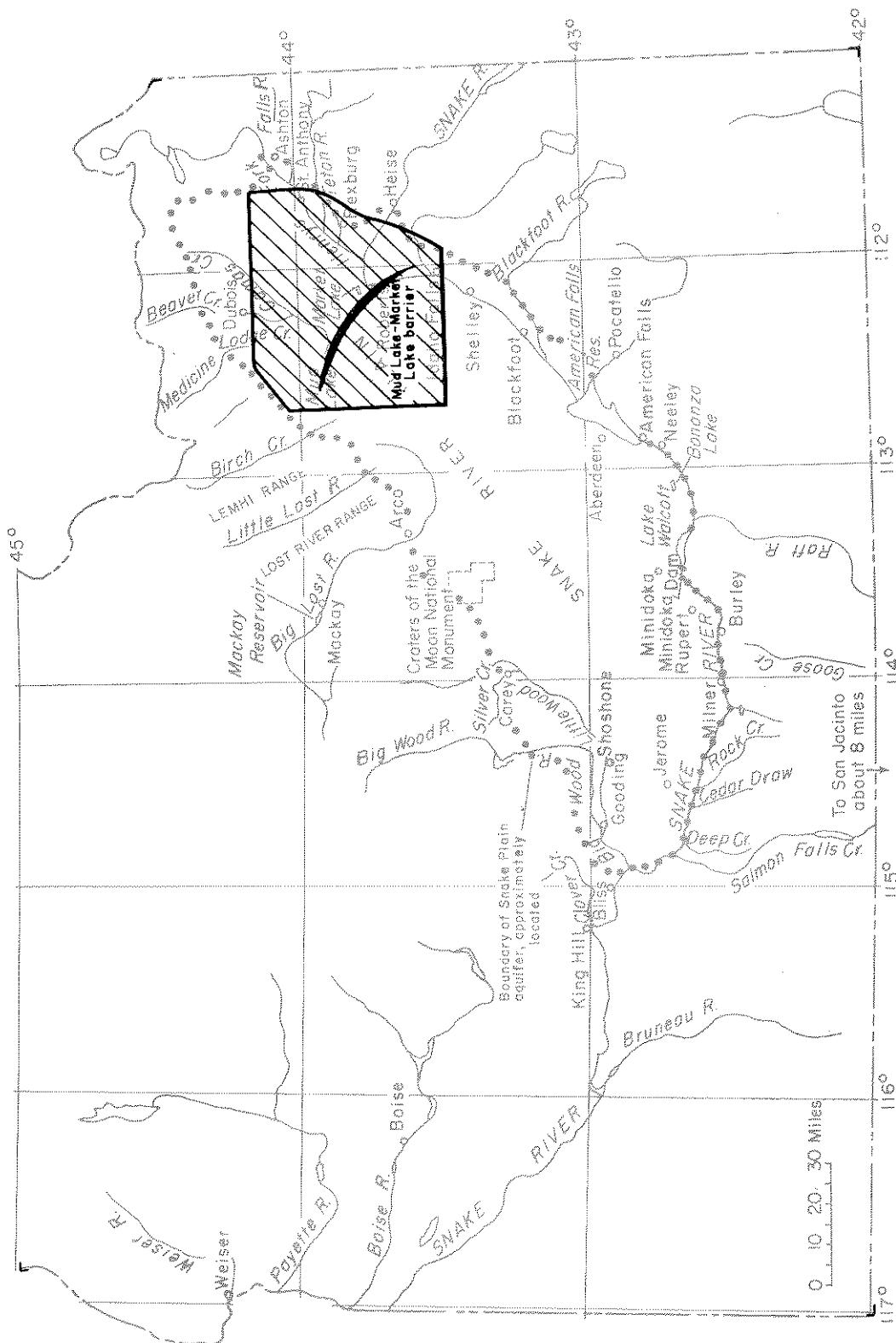
Water in the Mud Lake region (fig. 1) serves two important functions. Not only is it used for the irrigation of extensive farmlands in the region, but it has been postulated to be an important source of recharge to the Snake Plain aquifer. Movement of recharge to the Snake Plain aquifer is, however, complicated by the fact that in the vicinity of Mud Lake and Market Lake there is a hydrologic barrier to the movement of ground water. This barrier occurs along a northwest-trending line that extends through Market and Mud Lakes. The presence of this barrier is indicated by a change in slope of the water table. Northeast of the barrier the water table is at a relatively shallow depth (a few feet to a few tens of feet) and is very flat (it has a gradient of about 2 feet per mile). Southwest of the barrier the water table is at a considerably greater depth (several hundred feet) and the water table is again relatively flat (the gradient is about 5-10 feet per mile). At the barrier, in the area extending from northwest of Mud Lake to southeast of Market Lake, the water-table gradient is quite steep, about 30-60 feet per mile, and a considerable range occurs in the elevation of water levels in wells screened or perforated at different depths.

Previous investigators (Mundorff and others, 1964, pl. 4) have indicated that about 2.2 million acre-feet of ground water flows across the barrier annually as recharge to the Snake Plain aquifer. Later investigators (Norvitch and others, 1969, p. 39) had difficulty, however, in logically assigning aquifer transmissivity values large enough to transmit this quantity of water through the barrier. This difficulty made apparent the need for additional data descriptive of the geologic and hydrologic characteristics of the barrier.

The purposes of this report are, therefore, to (1) present the data obtained during the period 1969-70 from test wells drilled in and around the barrier and from adjacent areas; (2) describe water-level and stratigraphic relations in and near the Mud Lake-Market Lake barrier as indicated by these data; (3) relate the data to existing hydrologic concepts of the barrier and, where necessary, to revise those concepts; (4) evaluate the adequacy of the data collected to describe existent hydrologic relations; and (5) delineate areas where additional hydrologic data are needed.

### Location and General Features

The Mud Lake region is in the northeastern part of the Snake River Plain in eastern Idaho (fig. 1). The Mud Lake basin encompasses a broad, shallow, closed depression about



**FIGURE 1. Map of southern Idaho showing the Snake River Plain and area covered by this report.**

20 miles wide. Mud Lake is in the lowest part of this depression. The Market Lake basin is a much smaller depression that also contains a lake. Market Lake basin is open to the Snake River on the southeast and is separated from the Mud Lake basin by a topographic divide that is a few tens of feet in height. Mud Lake covers about 12 square miles when the lake is full, whereas Market Lake covers only several tens of acres. The principal area of study includes the basins containing the lakes and the area immediately adjacent to the basins. However, to assure that the geology and hydrology of these basins as presented in this report are in harmony with that in adjoining areas, pertinent data from outside these basins are utilized in the following discussions. For the purpose of this report, the study area shown in figure 1 is here designated the Mud Lake region. This is in accord with usage in the first comprehensive report on the area (Stearns and others, 1939).

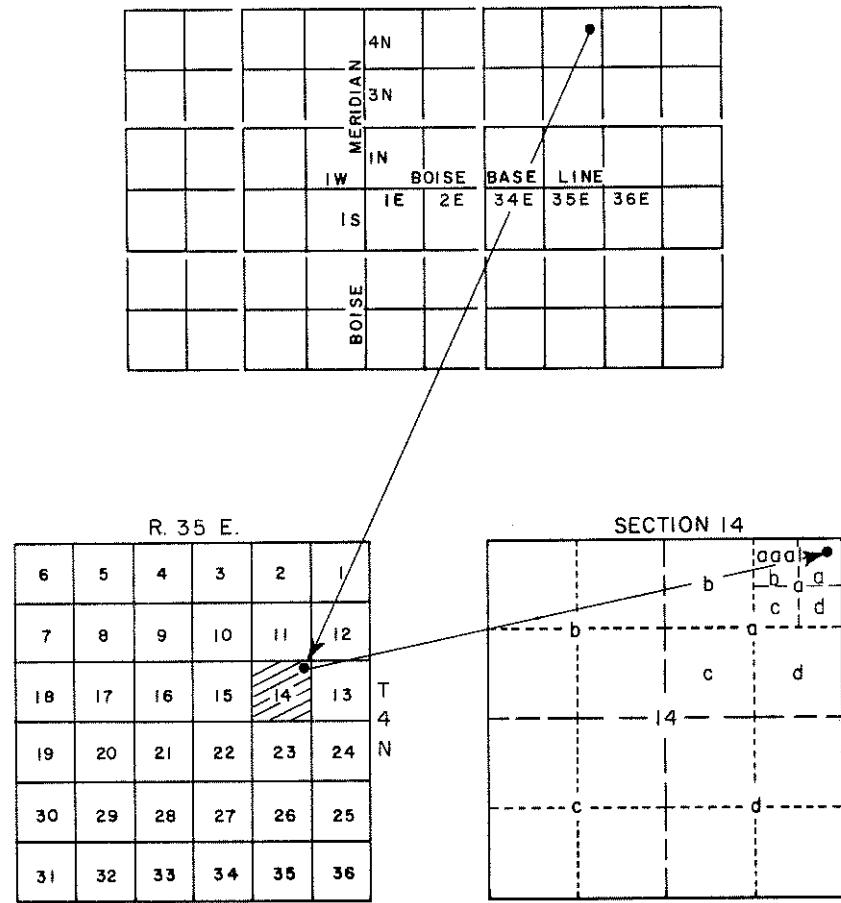
### Previous Work

Stearns, Crandall, and Steward (1938, p. 111) stated that a definite ground-water cascade, caused by a ground-water barrier, exists between the mouth of Birch Creek and Idaho Falls along a curved line that passes through the south side of Mud Lake and the west side of Market Lake. Stearns, Bryan, and Crandall (1939, p. 50-57, 59-60) described a perched water table and a main water table in the vicinity of Mud Lake and the Mud Lake basin. They also described the lakebeds which directly underlie both the Mud Lake and Market Lake basins and the basalt flows which encroach into the basin (Stearns and others, 1939, p. 37-38). Mundorff, Crosthwaite, and Kilburn (1964, p. 132-136) discussed the barrier and ground-water conditions in the Mud Lake area.

### Well-Numbering System

The well-numbering system used by the U. S. Geological Survey in Idaho indicates the location of wells within the official rectangular subdivision of the public lands, with reference to the Boise base line and meridian. The first two segments of the number designate the township and range. The third segment gives the section number, followed by three letters and a numeral, which indicate the quarter section, the 40-acre tract, the 10-acre tract, and the serial number of the well within the tract, respectively. Quarter sections are lettered a, b, c, and d in counterclockwise order, from the northeast quarter of each section (fig. 2). Within the quarter sections, 40-acre and 10-acre tracts are lettered in the same manner. Well 4N-35E-14aaa1 is in the NE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$  sec. 14, T. 4 N., R. 35 E., and is the first well visited in that tract.

Several wells in the report area are equipped with piezometers and each piezometer has been assigned a well number. The shallowest piezometer in the well has the lowest serial number and the next deeper piezometer has the next higher serial number.



**FIGURE 2. Diagram showing well-numbering system.  
(Using well 4N-35E-14aaa1.)**

#### Acknowledgments

The U. S. Bureau of Reclamation supplied well data including drillers' logs, core samples, and water-level measurements for the seven wells drilled or deepened as part of this study and for other wells constructed during previous test drilling in the Bureau of Reclamation's Lower Teton Basin Project area.

## GEOHYDRAULIC RELATIONS OF THE MUD

### LAKE—MARKET LAKE BARRIER

#### Previous Concepts of the Mud Lake-Market Lake Barrier

Stearns, Crandall, and Steward (1938, p. 111) state: *The contour lines show that a definite ground-water cascade exists between the mouth of Birch Creek and Idaho Falls, along a curved line passing through the south side of Mud Lake and the west side of Market Lake. Some large faults pass into the region of this cascade from the adjacent mountains and became buried by Pleistocene flows. Faults may cause this ground-water cascade by the downward displacement of the impermeable basement in this area, but it is more probably caused by the ending of clay beds or other perching formations.*

Stearns, Bryan, and Crandall (1939, p. 50) state that *Mud Lake and the water found in shallow wells in the vicinity of the lake form a perched body of water that lies a few hundred feet above the water table of a deeper body of ground water.* They also say that at Market Lake the hydrology and geology are somewhat similar to those at Mud Lake (Stearns and others, 1939, p. 59-60).

In general, previous investigators have noted that northeast and southwest of the Mud Lake-Market Lake barrier where water-table gradients are low (5-10 feet per mile), a very permeable basalt is the principal water-bearing formation, whereas at the barrier, where gradients are steep (30-60 feet per mile), the principal water-bearing formations are less permeable clay, silt, sand, and some gravel. Also, they believed that the ground water occurs principally under perched and water-table conditions, although weak artesian pressures were recognized in shallow wells on the east side of Market Lake (well data in files of U. S. Geological Survey) and in a narrow strip extending from Hamer to the site of former Spring Lake northwest of Mud Lake (Stearns and others, 1939, pl. 13). See figure 3. Using this information, they deduced that the barrier acts as a leaky dam. That is, as water moves laterally through the barrier it also percolates downward through the sedimentary beds. For this reason, the shallow beds contain progressively less water and depths to water increase toward the southwestern edge of the barrier. Soon after irrigation began in the Mud Lake-Market Lake area in the early 1900's, percolation of irrigation water caused an expansion of the perched water table in the sediments (mostly on the south and west sides of the barrier), thereby increasing the volume of saturated sediments. The area of perched water was again increased significantly in recent years, particularly south and west of Mud Lake, because large amounts of ground water pumped in the area north of Mud Lake were conveyed by canals to irrigated tracts west and southwest of the lake.

For convenience in the following discussion, the term *barrier* will be retained, but, as will be pointed out later, the concept of the barrier is changed by the data collected during this study.

## Results of Test Drilling

Five wells were drilled to depths of 1,000 feet or more and two pre-existing wells were deepened in the general vicinity of the barrier in the summer and autumn of 1969 by the U. S. Bureau of Reclamation. In 1967 and 1968, prior to the beginning of this study, the Bureau drilled several deep test holes near and northeast of Market Lake. Data from these wells, a few private wells, and from municipal wells several hundred feet deep, provide most of the basis for the interpretations made in this report. Some of these data are summarized in table 1. Drillers' logs and other additional data are presented in the appendix, and well locations are given in figure 5. Pertinent water levels obtained in other wells were also used in this study. However, most of these other wells extend only a few tens to a few hundreds of feet below water level, and drillers' logs for these wells are not presented because they do not indicate geologic and hydrologic conditions to any significant depth.

The five wells constructed for this study were drilled, using air-rotary or cable-tool equipment, to depths of approximately 500 feet and then were core-drilled to approximately 1,000 feet. Deepening of the two pre-existing wells was accomplished by core drilling. Six of these seven wells contain two to five piezometers each. (See Appendix for well-construction diagrams and logs.) The one well in which piezometers were not installed was equipped with a continuous water-level recorder. Although each piezometer is a separate and distinct well that was constructed for the purpose of monitoring water levels, in the interest of conserving space and for ease of presentation, the maps and the geologic sections show only one well at each piezometer cluster.

Geophysical and drillers' logs of wells in the area of the barrier show that upgradient from the barrier a considerable number of sand, silt, and clay beds are interbedded with basalt flows; for example, 610 feet of the log of well 8N-34E-17ccc6 shows sediments and 390 feet basalt (fig. 4, section B-B'). The sediments consist of beds of clay that resemble varved glacial clay at some places, silt, and fine-to-coarse sands that range in thickness from a few inches to more than 50 feet. At some places, the clays and sands contain fine-to-coarse gravel.

Well logs show that both the essentially flat-lying sediments and the basalt extend several miles north and east of the barrier, although the areal extent of individual sedimentary beds and basalt flows cannot be determined with any degree of confidence. Southwest of the barrier, except in the area near the mouth of Birch Creek where thick deposits of sediments were found in wells, basalt is the predominant rock type and the sedimentary beds are sparse and thin.

The geologic map (fig. 6) shows the surficial geology in the Mud Lake region. Informal names used by Stearns, Bryan, and Crandall (1939, pl. 3) were assigned to the geologic units for convenience. These units are also shown on the geologic sections and fence diagram (figs. 4 and 5). The basalt and interbedded sedimentary deposits shown are a part of the Snake River Group of Pleistocene and Holocene age. These rocks and the more recent alluvium are

the principal water-bearing formations explored by drilling. The silicic volcanic rocks shown on the geologic map were encountered in four wells (figs. 4 and 5). These rocks also contain ground water, although they are generally not as permeable as the basalt.

Test-drilling data and other well data showed that north and northeast of the barrier water in the upper zone of saturation occurs under water-table conditions. However, at the barrier area and for an unknown distance to the northeast, the water in the deeper aquifers is under artesian pressure. Northwest and west of Mud Lake and southwest of Terreton and Montevieu, perched ground water occurs at shallow depth.

Wells 8N-34E-17ccc3-6 were completed so that water levels in four different water-bearing zones could be monitored at this location. Another well a few feet to the west (8N-34E-17ccc7) monitors the shallowest water level. Although the water level for each zone is different, those in the second and third shallowest zones are not greatly different. The following are the water levels and the water-bearing zones monitored at this site.

Well No.	Piezometer or Casing Size	Depth Monitored (feet)	Depth to Water (feet) (12-13-69)	Aquifer
<b>8N-34E-</b>				
17ccc7	6-in. casing	35 to 47	30±	Sand
17ccc3	8-in. casing	340 to 350	46.7	Sand
17ccc4	1-in. pipe C	460 to 545	45.0	Sand & gravel
17ccc5	3/4-in. pipe B	566 to 888	170.1	Basalt
17ccc6	3/4-in. pipe A	912 to 1,006	223.9	Basalt

As indicated above, water levels at this site are not consistent. The water level in the 6-inch well is about 15 feet higher than that in the next zone. The water level in the 1-inch pipe is 1.7 feet higher than in the 8-inch casing. At deeper depths, the water levels are lower. A more typical example of water levels at different depths below land surface is illustrated by wells 6N-36E-11aba1-4 in the following table.

Well No.	Piezometer or Casing Size	Depth Monitored (feet)	Depth to Water (feet) (12-13-69)	Aquifer
<b>6N-36E-</b>				
11aba1	10-in. casing	14 to 245	70.7	Basalt
11aba2	3/4-in. pipe C	258 to 615	35.1	Basalt
11aba3	3/4-in. pipe B	628 to 915	34.8	Basalt & sand
11aba4	3/4-in. pipe A	925 to 990	18.1	Basalt

At this site, the water table is about 70 feet below land surface and the deeper water-bearing zones are under artesian pressure, with the deeper zones having the higher heads. These two examples demonstrate the variety of ground-water occurrences in the area. The approximate positions of the water levels in piezometers and the water-bearing formation monitored by the piezometers are shown in the geologic sections (fig. 4).

### Geophysical Studies

In 1961, 1963, and 1964, several gravity surveys were made by the U. S. Geological Survey in the eastern Snake River Plain which included a part of the Mud Lake-Market Lake region. Additional gravity observations were made in 1970 in the study area to determine if this geophysical method could be used to interpret the geology of the region and thus further the understanding of geologic-hydrologic relations. The resulting gravity map did not show any apparent relationship of the variations in gravity to the geology of the barrier. Therefore, the gravity data are not included in this report.

### Interpretation of Data

The geologic data from the test drilling show that much of the Mud Lake region is underlain by both basalt flows and sedimentary deposits to a depth of at least 1,000 feet. Southwest of the Mud Lake-Market Lake barrier, wells in excess of 1,000 feet in depth have found mostly basalt, and the thick interbedded sediments found at and northeast of the barrier are not present.

The well logs on the geologic sections (fig. 4) show the basalt flows and the interbedded sedimentary deposits. The alluvium which is at the surface east of Henrys Fork is overlain by basalt of Little Grassy Butte and underlain by early basalt west of the river (geologic section A-A'). The alluvium pinches out near Market Lake. West of Market Lake, the lakebeds of Terreton occur at the surface and a thick lens of sediments occurs at a depth of about 600 feet. The only other significant sedimentary deposits are far to the west at the mouth of the Birch Creek basin and in the vicinity of the Big Lost River playa beyond the area of study. Geologic section B-B' shows that north of Terreton sedimentary deposits predominate in the geologic section, but south of Terreton, sediments are not significant. Geologic section C-C', about 15 miles east of section B-B', illustrates the same relationship as shown in B-B', but the well data are more numerous and more detail can be shown. The correlation of units between wells is tentative, but it serves to illustrate the general geologic conditions of the region as revealed by the test drilling and other well data.

In order to show the geologic conditions in a perspective not possible with geologic sections, a fence diagram was constructed (fig. 5). The fence diagram shows a thick sequence of sediments in the Market Lake-Idaho Falls-Rexburg area and northwest of Mud Lake. Several basalt flows are intercalated in sediments. There are sedimentary deposits in the

subsurface between these two parts of the region, but they are thinner and the basalt units are more numerous and thicker. Northeast of a line between Dubois and St. Anthony, sparse data imply that the sediments become subordinate or even insignificant. Apparently, the streams were eroding and not depositing sediments in this part of the area. In the southwestern part of the region, basalt predominates and sedimentary beds are sparse and thin. It should be noted that geologic conditions below the depths drilled are unknown.

The water-level contour map (fig. 3) was constructed on the water table in the sedimentary aquifer except in that part of the area where perched water is known to occur. The hydrologic data show that, in general, upstream from the barrier, ground water occurs under water-table conditions in the uppermost saturated zone, although there are local areas with weak or low artesian pressures as described previously. However, in the deeper zones, ground water is under artesian pressure and contours for the artesian pressure surface are not shown. Data are not adequate to determine the northeasterly extent of the artesian aquifers from Mud Lake, but the artesian aquifers may pinch out north and east of Dubois, where the water-table steepens sharply at about the 4,800-foot contour. Water-level data from the test wells show that artesian pressures begin to develop about halfway between Rexburg and Market Lake and become progressively greater in the direction of the barrier (fig. 4, geologic section A-A'). Artesian pressures are found in both basalt and sediments. In general, the artesian pressures cause the water levels to rise above the water table and the deeper the well the higher the artesian pressure. For example, in wells 6N-36E-11aba1-4, described above, the elevation of the water table is at about 4,747 feet above mean sea level; the water level in the first artesian zone is about 4,783 feet, in the second zone at about 4,783 feet also, and in the third zone at 4,801 feet or 250 feet higher than the 4,570-foot contour 8 miles to the southwest (fig. 3). This implies a hydraulic gradient of something more than 30 feet per mile. In this and other test wells, the elevations of the artesian pressures range from about 1 to 53 feet above the elevation of the water table at the well site. Two private wells, 5N-35E-4bda2 and 4N-36E-1dac1, reportedly had artesian heads 200 feet higher than the elevation of the water table. (See fig. 4).

There are exceptions to this zonation of artesian pressure. In the wells north of Montevieu that were described previously (8N-34E-17ccc3-6), the shallow water is perched and the deeper zones are under artesian pressure. The deeper water levels in this well are significantly lower than in a private well (6N-34E-7ba1), which is about 10.5 miles to the south. The reason for this is not clear, but the barrier probably does not extend from Mud Lake to Birch Creek valley as was described in previous reports. Instead, it may trend north or even northeast of Mud Lake.

Downstream from the barrier, the only artesian pressures are local occurrences that are common in basalt of the Snake River Group and are on the order of a few tenths of a foot to a few feet higher than the water table. This is caused by the interfingering of lava flows and the generally low vertical permeability of the basalts. Mundorff, Crosthwaite, and Kilburn (1964, p. 143) describe this factor in causing slight but significant differences in water levels in successive permeable zones in the basalt. Morris and others (1964, p. 40-42)

describe the upward and downward flow of water from one permeable zone to another in bore holes on the National Reactor Testing Station and this phenomenon has been observed elsewhere in the Snake River Plain.

Upstream from the barrier, ground water in the non-artesian aquifer moves downgradient, or about normal to the water-level contours, southwestward and westward toward the barrier. In the downgradient part of the barrier, the water has a large downward component of movement as it percolates through the basalt and sediments to join the main body of water in the Snake Plain aquifer.

The water in the artesian aquifers appears to move in approximately the same direction as the non-artesian water except in the area northwest of Mud Lake. The reason for artesian pressures lower than the water table in well 8N-34E-17ccc6 is not apparent from the data. Either lithologic changes or some structural feature (or both) could cause this condition. For example, Stearns, Bryan, and Crandall (1939, p. 43) and Mundorff, Crosthwaite, and Kilburn (1964, p. 133) suggest that there is a fault along the north side of Mud Lake, but Malde (1971) found no evidence of faulting.

In general, in the area where the hydraulic heads in the artesian aquifer are above the water levels in the water-table aquifers, upward leakage recharges the water-table aquifer. The data are not adequate to evaluate the amount of upward leakage, but it may be a significant amount in the Mud Lake part of the region.

The artesian pressures found in the test and other wells indicate that the net hydraulic gradient is steeper than was previously known. Although the hydraulic properties of the artesian aquifers are not known, the data suggest that much of the ground water in the region moves through the artesian aquifers before discharging to the Snake Plain aquifer southwest of the barrier. This study has significantly modified the concept of the barrier. Previous descriptions imply that the barrier is more or less a linear phenomena with a restricted areal extent. Actually, the barrier denotes a change in geology. From the vicinity of the barrier area, as described by Stearns, Crandall, and Steward (1938, p. 111), up the water-table gradient for at least a few tens of miles, the saturated geologic section consists predominantly of beds of sediments that are intercalated with numerous basalt flows. Downgradient from the barrier, sedimentary deposits are not common and practically all the water-bearing formations are basalt, at least to the depths explored so far. Thus, the barrier is a transition zone from a sedimentary-basaltic sequence to a basaltic sequence.

The Mud Lake region lies close to high mountain ranges which shed large amounts of sediments during the Pleistocene and Holocene Epochs, particularly during times of glaciation and high precipitation. These sediments were deposited in streams and lakes in low areas. Basalt flows of local origin were erupted at infrequent intervals during deposition of the sediments. Eruptions of basalt on the Snake River Plain south and west of the Mud Lake region impeded the spread of sediments in those directions. The complex interbedding of basalt and sediments produced a hydrologic system different from the Snake Plain

aquifer system and thus the Mud Lake region should be excluded from the Snake Plain aquifer.

This study did not develop new data to either support or change the estimate by Mundorff, Crosthwaite, and Kilburn (1964, p. 136) of the quantity of ground-water flow in the Mud Lake part of the region. It should be noted that the direction of ground-water flow as shown on their plate 4 applies only to the water table and not to the water in the artesian aquifers. Irrigation on the Egin Bench has undoubtedly influenced the water table and artesian pressures in the Mud Lake area, but an assessment of this effect is not possible at this time. Perhaps modification and stressing of the analog model might shed some light on this problem, and an analysis using this model will be attempted later in the project.

#### ADDITIONAL STUDY NEEDS

In the area of Mud Lake, a few hundred irrigation wells pump water from the water-table aquifer and Mud Lake receives much of its inflow from ground water. Surface-water use for irrigation is of minor importance. In the area of Market Lake and the Henrys Fork drainage, the reverse is true. Surface water is the major irrigation supply and ground-water use is minor. If the past is a clue to the future, development of ground water in the Mud Lake basin will continue and, because the water users have expressed concern about the present stage of development of the water-table aquifer, attempts will be made to utilize the artesian aquifers. In the Market Lake and Henrys Fork areas, ground-water development is being planned and additional developments are being considered. It would be desirable to assess the effects that planned and potential development will have on the ground-water regimen and to provide information for optimum management.

The test drilling has indicated in a general way the hydrologic and geologic conditions in the barrier and upgradient from the barrier area. However, only the upper 1,000 feet of the geologic section has been explored. There are no reliable data on the thickness of the water-bearing formations in the barrier area and only a little is known about the areal extent of the artesian aquifers. Also, the available data are not adequate to describe even generally the water-bearing characteristics of the artesian aquifer nor the effects that pumping in one zone would have on adjacent zones. Thus, more data are needed to define the areal extent and water-producing potential of the artesian aquifers and to evaluate the permeability of the perching beds above the artesian aquifers. Production test wells, deeper exploratory holes, and resistivity geophysical soundings could be used to obtain these data.

A production test well in the artesian aquifer could be drilled almost anywhere in the general area encompassed by a line from Roberts to Camas to Montevieu to Roberts. One suggested location would be at the site of well 7N-35E-13aad1, where an observation well was drilled for the present investigation. Pumping the proposed production well for a sufficient period of time would provide information on the effects of deep pumping on the shallower water-table aquifer. The results of this test could then be evaluated for additional deep testing in other parts of the region.

Deeper exploratory holes should be drilled in the same general area outlined in the preceding paragraph to determine more about the thickness and character of the aquifers below a depth of 1,000 feet. Deeper exploratory holes would determine the possibility of drilling deeper production wells. To resolve the problem of the areal extent of the artesian aquifers, exploratory holes about 2,000 feet deep should be drilled in the basalt plain that occurs several miles northeast of Mud Lake, principally in Clark and Fremont Counties.

To minimize the number of exploratory holes needed, direct-current resistivity soundings could be used to correlate the major geologic units between widely spaced exploratory wells. However, the only method of determining the yield of any aquifers below the depths explored to date will require deep production wells.

This study revealed anomalous artesian pressures in wells 8N-34E-17ccc3-6 northeast of Montevieu. Additional drilling and geophysical studies are needed to explain this condition and the effects of local development on the entire aquifer systems.

The present project study was not structured to answer the above problems.

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## **APPENDIX**

## **APPENDIX**

**Well logs and well construction details of the wells constructed by the U. S. Bureau of Reclamation and used in this report are presented in the following pages.**

**TABLE 1**  
**WELL DATA FROM EXPLORATORY AND OBSERVATION WELLS DRILLED FOR THIS STUDY**  
**AND FOR THE LOWER TETON DIVISION, TETON PROJECT, U.S.B.R.**

(\* - Well drilled or deepened for this study; A, B, C, and D, 3/4- or 1-inch piezometer.)

Well No.	Depth (feet)	Number or Casing Size <sup>a</sup>	Piezometer		
			Interval Open to Formation (feet)		Depth to Water <sup>b</sup> (feet)
9N-39E- 4aa1	885	5½-inch	845	-	885
9N-40E- 5dd1	747	5½-inch	705	-	747
8N-34E-17ccc3*	1,006.5	6-inch	340	-	350
17ccc4*		C	460	-	545
17ccc5*		B	566	-	888
17ccc6*		A	912	-	1,006.5
17ccc7		6-inch	47	-	48
8N-40E- 1cad1	376	5½-inch	330	-	376
21ddd1	450	C	15	-	80
21ddd2		B	192	-	382
21ddd3		A	423	-	450
7N-35E-13aad1*	1,000.7	14-inch	14	-	515
13aad2*		C	590	-	760
13aad3*		B	792	-	827
13aad4*		A	838	-	1,000.7
7N-38E-23dba3	632.5	8-inch	181	-	200
23dba4		C	313	-	426
23dba5		B	451	-	595
23dba6		A	613	-	632.5
7N-39E- 1ccc1	122	6-inch	84	-	122
1ccc2	55	6-inch	19	-	55
16acc1	444	8-inch	215	-	444
16acc2	107	8-inch	96	-	107
16acc3	38	8-inch	28	-	38
16acc4	503	22-inch	255.6	-	503
34ccb1	26	8-inch	14	-	26
34ccb2	342	8-inch	161.5	-	342
34ccb3	410	24-inch	156.7	-	410
7N-40E-19add1	394.7	24-inch	198.5	-	394.7
19add2	355.0	6-inch	144	-	355

TABLE 1 (Cont'd.)

**WELL DATA FROM EXPLORATORY AND OBSERVATION WELLS DRILLED FOR THIS STUDY  
AND FOR THE LOWER TETON DIVISION, TETON PROJECT, U.S.B.R.**

Well No.	Depth (feet)	Number or Casing Size <sup>a</sup>	Piezometer		
			Interval Open to Formation (feet)		Depth to Water <sup>b</sup> (feet)
7N-40E-19add3	40.5	8-inch	31.3	-	40.5
19add4	20.5	8-inch	10.7	-	20.5
20cdc1	399.6	C	63	-	189
20cdc2		B	220	-	356
20cdc3		A	378	-	399.6
6N-36E-11aba1*	1,002.2	10-inch	14	-	245
11aba2*		C	258	-	615
11aba3*		B	628	-	915
11aba4*		A	925	-	990
6N-37E-29aca1	573	16-inch	21	-	62
29aca2		12-inch	151	-	175
29aca3		10-inch	404	-	440
29aca4		6-inch	505	-	573
6N-38E-25acb1	685	24-inch	450.6	-	685
25acb2	681	8-inch	483.3	-	681
25acb3	243.7	8-inch	236.7	-	241.7
25acc4	50	8-inch	43	-	48
30bad2	638	6-inch	260	-	270
30bad3		B	430	-	543.5
30bad4		A	575	-	638
6N-39E-10bbb1	636.8	6-inch	168	-	260
10bbb2		C	290	-	317
10bbb3		B	339	-	545
10bbb4		A	570	-	636.8
23aac1	25	8-inch	20	-	25
23aac2	465	8-inch	257	-	435
23aac3	438	24-inch	245	-	426
6N-39E-30adc1	699.7	6-inch	263.6	-	385
30adc2		B	406	-	620
30adc3		A	638	-	699.7
5N-33E-13dbc1*	1,006.5	8-inch	276	-	290
			300	-	317

TABLE 1 (Cont'd.)

**WELL DATA FROM EXPLORATORY AND OBSERVATION WELLS DRILLED FOR THIS STUDY  
AND FOR THE LOWER TETON DIVISION, TETON PROJECT, U.S.B.R.**

Well No.	Depth (feet)	Number or Casing Size <sup>a</sup>	Piezometer		
			Interval Open to Formation (feet)		Depth to Water <sup>b</sup> (feet)
5N-33E-13dbc2*		B	357	-	493
		A	540	-	1,006.5
5N-36E- 2bda1	995	16-inch	18	-	405
2bda2		12-inch	838	-	923
2bda3		8-inch	985	-	995
5N-39E-18cac1	336	6-inch	300	-	336
4N-35E-14aaa1 *	1,000	6-inch	430	-	1,000
4N-38E-12bbb1*	1,026.0	10-inch	190	-	275
12bbb2*		D	475	-	490
4N-38E-12bbb3*		C	538	-	705
12bbb4*		B	726	-	842
12bbb5*		A	850	-	1,026
2N-35E- 2bbc1*	1,302	10-inch	110	-	800
2bbc2*		B	883	-	982
2bbc3*		A	1,038	-	1,147
					578.0

<sup>a</sup> Some wells have 3/4-inch and 1-inch diameter piezometers that are designated by letters A, B, C, and D. At other places, three or four wells of various depths have been drilled within a few feet of each other.

<sup>b</sup> April 1969.

<sup>c</sup> Water-level measurements on 6-2-70.

## BUREAU OF RECLAMATION - REGION I

LOG OF WELL										
Project	Lower Twin Division	Feature	Rehabilitated Well (Rehabilitated)	State	Idaho					
Well No.	28-325-Well (Well B)	Location	Sec. 4, T. 9 N., R. 39 E.							
Total Depth	886.6 ft.	Begun	Completed Prior to 1960	Drilling Method	Date 10-22-67					
Static Water Level	886.6 ft.	(above) Means Pt. Ordinance Ground (below) Mean Sea Level								
Elevation (ground)	5668.2	W.L. Meas. Pt.	5669.68	Top of cas. plate						
Yield		Other Data Owner	State of Idaho, Stream No. 532							
Logged By		Geophysical Log On	By R.R.S./H.S.S.	Drilled By						
Drilling Data	Description	Well Diagram	Diagram	Core Length	Sample Type	Core Recovery	Core Description	Geological Column		
Pump Test	52 in (±) I.D. under Spec. 100C 9341 SF) In August, 1967. Contract work consisted of removing well or house and pump, cleaning and deep- ening well from 870 ft. and adding casing cap. Contractor - Common Drilling Co.			0.0 to 886.6	BASALT with numerous sedimentary inter- flow zones					
Water Samples										
Used stock well 52 in (±) I.D. under Spec. 100C 9341 SF) In August, 1967. Contract work consisted of removing well or house and pump, cleaning and deep- ening well from 870 ft. and adding casing cap. Contractor - Common Drilling Co.										
1½" plug M.P.										
886.6 (±) hole										
Bottom of 5½ in (±) hole										
Total Depth - 886.6										
Note: Lithologic log (classification) based on interpretation of geophysical logs.										
SAMPLE TYPE										
CG = Core										
GL = Cuttings Log										
D = Drillers Log										
PROJECT Lower Twin Division										
WELL NO 28-325										
REF ID: WEL										
SHEET 1 OF 1										

## BUREAU OF RECLAMATION - REGION 1

SHEET 1 OF 1

## LOG OF WELL

Project Leader Date Drilled		Feature Observed Well (Rehabilitated)		State Idaho	
Well No. 874/408-2401 (Well C)	Location S.E., Section 7, T. 9 N., R. 40 E.				
Total Depth 747.6	Begun Completed Prior to 1939	Drilling Method			Date 9-21-67
Static Water Level: 705.2	Above Meas. Pt. 535.95	Muds	Original ground		
Elevation (ground) 535.4	Below	Top of core			
Yield	Other Data: Owner State of Idaho	plate			
Logged By	Caliper, Gamma, and Geophysical Log Camera by K.R.T.S.U.S.G.S.	Drilled By			
Sump 7.5 ft	Water 2.5 ft	Heads	2.5 ft	2.5 ft	2.5 ft
After Samples	Cleaned up	Temp 72° F	72° F	72° F	72° F
Dug out well 28 in. (±) I.D. rehabilitated under eng. + 0.5 to 1.00 ft. unknown depth but probably not exceeding 5 ft. In August, 1967.					
Contract work consisted of removing silt, cleaning, and deepening well from 730 ft. and adding casting cap. Contractor - Commerce Drilling Co.					
Fl. R.F.-535.48 raised on VR corner conc. base. Core taken by S.B.K. - 1967					
Bottom of c. 747.6 in. (±) hole					
Total Depth - 747.6					
Note: Lithologic log (Classification) based on interpretation of geophysical logs.					
SAMPLE TYPE Ort: 2408-2401 ID: 874/408-2401					
PROJECT 100% Return Division WELL NO 874/408-2401 Rehab Well C					

## BUREAU OF RECLAMATION - REGION 1

## SHEET 1 OF 2

## LOG OF WELL

Project	Lemhi Basin Division	Feature	Stereonet Drill Hole (Morterite Area)	State	Idaho
Well No.	SH-342 - 17 ccc (Site 12)	Location	270' north, 335' east of section corner		
Total Depth	1006.3	Section	17, TIR 32N, R3E		
Static Water Level	see below	Drilling Method	Diamond Core to 1006.3'		
Elevation (ground)	4802.44	Date	8/11/69	Completed	8/11/69
Yield	-	(above) Meas. Pt.		Date	8/16/69
Logged By	G. I. Bassett	(below) Meas. Pt.		W. L. Meas. Pt.	-
Other Data: Geologist, Inspector and Geologic Report: Cope Drilling & Pump Co.					
Geophysical Log Conducted: Cope Drilling & Pump Co.					
Drilled By: Electric, caliper, temperature, Drilled By: Justice Core Drilling.					
Geophysical Log Conducted: Cope Drilling & Pump Co.					
Drilling Data Pump Tests Water Samples	Description of Well Completion	Weight D.C. / Log Depth in ft. feet m	Weight D.C. / Log Depth in ft. feet m	Classification and Physical Condition	

Chisel drill to 509'; then 5" x 12' television cased to 1006' under Specia. 1000-1040 ft. perfs. in bottom of each pipe.

Top of 6" cas. at 4811.67 ft.

**PFLONETERS**  
NP 12/11/69  
Elev. Depth Water  
A 4812.41 223.90  
B 4812.91 170.10  
C 4813.07 45.00  
D (6" cas.) 4811.67 46.70

Intersections in  
4" cas.  
340°  
150°

6-12 BASALT, gray, broken.  
35-76 SAND and GRAVEL, subangular to subrounded, predominately thrbolite.

76-80 CLAY, yellow-tan, sandy, disintegrates in water.  
80-85 SAND, coarse, with fine gravel.  
85-89 As above with yellow-tan silt.  
90-111 CLAY, tan, sandy, silty to sandy with gravelly zones.

151-165 CLAY, gray, sandy, slightly sandy.

165-201 SAND, medium to coarse, subrounded, clayey, predominantly ryolite and quartz, trace basaltic grains.

201-210 CLAY, tan.

210-263 CLAY, gray; 1-foot zone coarse sand, fine gravel at 256'.

263-280 BASALT, gray, very fine grained, trace feldspar needles, finely vesicular; vesicles near base filled with yellow-tan clay.

280-290 CLAY, yellow-green, silty to sandy, shales in water.

290-295 SAND, coarse, to fine gravel of ryolite, quartz, obidian, subangular to subrounded sand.

335-340 CLAY, tan with trace sand grains.

340-351 SAND, coarse, with fine gravel of subangular ryolite, quartz, trace basalt.

351-495 CLAY, gray to tan, silty.

Drilling Data Dump Tests Water Samples	Description of Well Completion	Weight D.C. / Log Depth in ft. feet m	Weight D.C. / Log Depth in ft. feet m	Well Diagram	Classification and Physical Condition
	514' & perts.	505' - 510' - 514" pipe 515' -	514' - 510' - 514" hole 516' -		D 495-540 SAND, coarse with fine gravel, subangular to subrounded ryolite, quartz, obidian, trace basalt.
	FLOMETER A 5/16" pipe				S 545-566.4 BASALT, gray, pumorous fine feldspar needles, moderately finely vesicular; 60' joints at 548, 565.5'; broken 565.9-566.3', 566.1-571.0 CLAY, tan to brick red, silty, basal fragments below 570.0.
	S45' Grout				571.4-606.6 BASALT, gray, somewhat feldspar needles vesicular to 575.5'; dense to 577.7, very vesicular to 581.2, dense to finely vesicular to 600.3'; banded, broken to 601.5'; scattered rugae with zirconite crystals to 605.8.
	S62' Gravel				606.8-659.8 BASALT, numerous, fine feldspar needles, zirconite crystals in some vesicles, occasional clay-filled joints; red-gray, vesicular to 613.4'; green, somewhat vesicular to 626.6'; red-gray, slightly altered to 632.2'; gray to red to 640.3'; greenish gray, dense to 659.8'.
	405' S perts.				659.8-663.5 ASH, gray to red-brown, silty to sandy, occasional basaltic fragment to 667.8'; alternating gray-green to brown, dense to very vesicular to 680.1'; feldspar lenses to 1/4".
	663.5-709.0 BASALT, brown-gray vesicular to 692.5'; with zirconite crystals, banding green-gray to brown with occasional red zones, dense to vesicular to 704.1'; gray, broken to 709.0.				690.0-716.0 SIL, gray, indistinct beddings, trace carbonaceous material, vesicular to 715.3'; dense to 716.7'; vesicular to 708.0-710.0; dense to 1006.5, gray color-banded below 999.9'.
	709' - 708' hole				709.0-925.0 SAND with CLAY, tan, partly silty, fine, slightly calcareous, bedding horizontal.
	700' - 700' hole				825.0-915.4 CLAY, tan, firm, slightly calcareous. 831.4-886.0 VARIED CLAY, horizontal band 1/16-1/4" waves of bright green plasmic clay grades to light gray silt, wavying more crude toward base.
	700' - 700' hole				886.0-906.3 CLAY, crudely varved, 1-1/2" layers brown clay with slightly contorted lamellations of gray silt, dip 0-5°.
	909.0-916.0 SIL, gray, indistinct beddings, trace carbonaceous material, fragments of basalt to 1-1/2" below 914.5.				916.0-1006.5 BASALT, gray to reddish brown, traces of fine feldspar, vesicular to 913.4'; dense to 914.7'; vesicular to 908.0-911.0; dense to 1006.5, gray color-banded below 999.9'.
	914' Gravel				1006.5 TOTAL DEPTH
	915' S perts.				

SAMPLE TYPE:	115' GRANITE		115' CLAY		SAND
PROJECT:	LEHBI BASIN DRILLING				
WELL NO.:	MHWB-17 ccc		MWZ-12		
Drillers Log:					
WELL LOG:					

PROJECT: Lemhi Basin Division

WELL NO. MHWB-17 ccc

## SHEET 1 OF 2

## LOG OF WELL

Project	Lemhi Basin Division	Feature	Stake 12	Location	Topo Sheet Section 17, TIR 32N, R3E
Well No.	SH-342 - 17 ccc (Site 12)	Approx.	700' north, 335' east of section corner		
Total Depth	1006.3	Location	Section 17, TIR 32N, R3E		
Static Water Level	see below	Date	8/11/69	Completed	8/11/69
Elevation (ground)	4802.44	(above) Meas. Pt.		Date	8/16/69
Yield	-	(below) Meas. Pt.		W. L. Meas. Pt.	-
Logged By	G. I. Bassett	Other Data: Geologist, Inspector and Geologic Report: Cope Drilling & Pump Co.			
Geophysical Log Conducted: Cope Drilling & Pump Co.					
Drilled By: Electric, caliper, temperature, Drilled By: Justice Core Drilling.					
Geophysical Log Conducted: Cope Drilling & Pump Co.					
Drilling Data Pump Tests Water Samples	Description of Well Completion	Weight D.C. / Log Depth in ft. feet m	Weight D.C. / Log Depth in ft. feet m	Classification and Physical Condition	

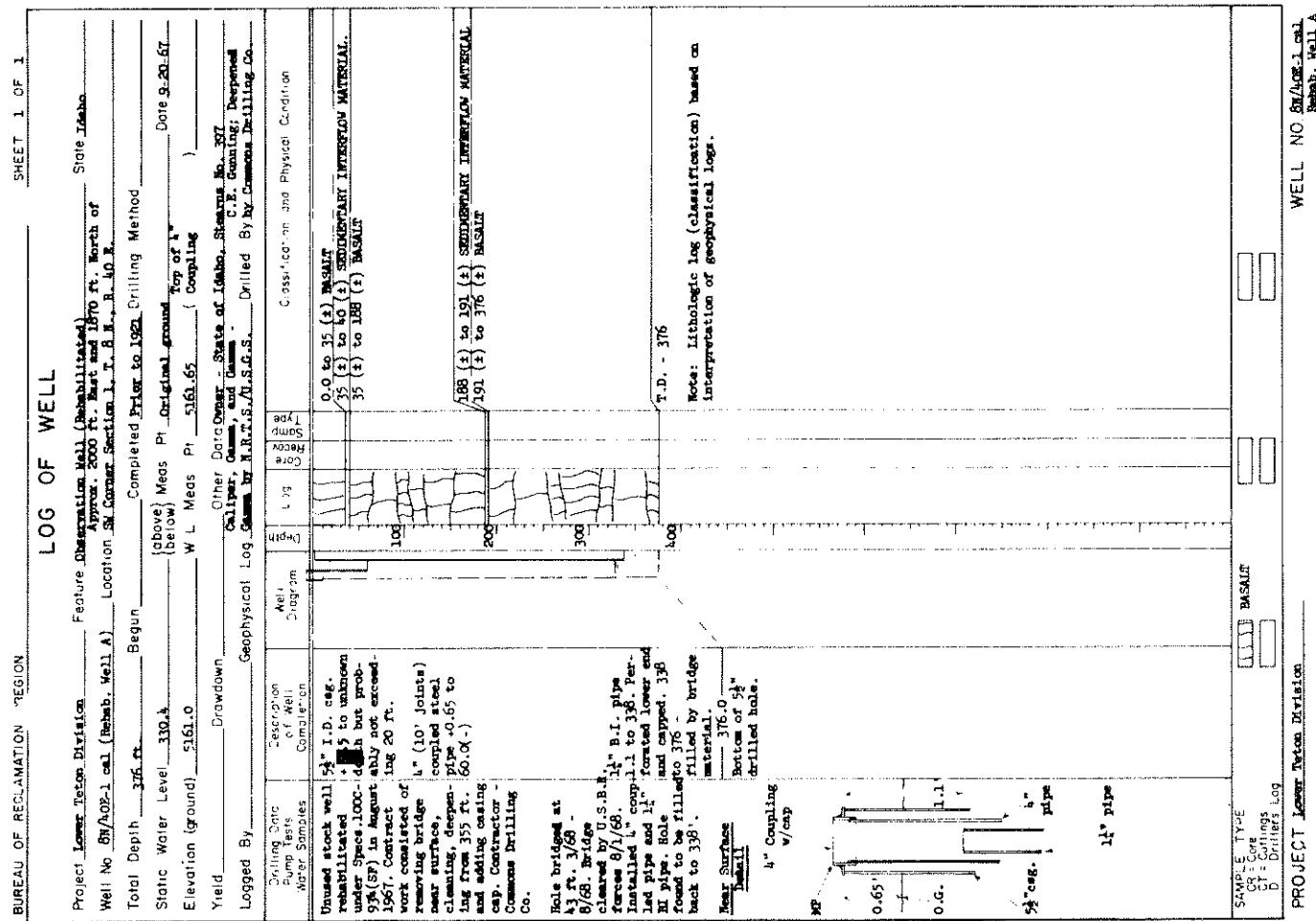
Chisel drill to 509'; then 5" x 12' television cased to 1006' under Specia. 1000-1040 ft. perfs. in bottom of each pipe.		509' - 514' - 515' -	514' - 510' - 514" hole 516' -	D 495-540 SAND, coarse with fine gravel, subangular to subrounded ryolite, quartz, obidian, trace basalt.
Top of 6" cas. at 4811.67 ft.				S 545-566.4 BASALT, gray, pumorous fine feldspar needles, moderately finely vesicular; 60' joints at 548, 565.5'; broken 565.9-566.3', 566.1-571.0 CLAY, tan to brick red, silty, basal fragments below 570.0.
<b>PFLONETERS</b> NP 12/11/69 Elev. Depth Water A 4812.41 223.90 B 4812.91 170.10 C 4813.07 45.00 D (6" cas.) 4811.67 46.70				571.4-606.6 BASALT, gray, somewhat feldspar needles vesicular to 575.5'; dense to 577.7, very vesicular to 581.2, dense to finely vesicular to 600.3'; banded, broken to 601.5'; scattered rugae with zirconite crystals to 605.8.
Intersections in 4" cas. 340° 150°				606.8-659.8 BASALT, numerous, fine feldspar needles, zirconite crystals in some vesicles, occasional clay-filled joints; red-gray, vesicular to 613.4'; greenish gray, dense to 626.6'; red-gray to red to 640.3'; greenish gray, dense to 659.8'.

151-165 CLAY, gray, sandy, slightly sandy.					
165-201 SAND, medium to coarse, subrounded, clayey, predominantly ryolite and quartz, trace basaltic grains.					
201-210 CLAY, tan.					
210-263 CLAY, gray; 1-foot zone coarse sand, fine gravel at 256'.					
263-280 BASALT, gray, very fine grained, trace feldspar needles, finely vesicular; vesicles near base filled with yellow-tan clay.					
280-290 CLAY, yellow-green, silty to sandy, shales in water.					
290-295 SAND, coarse, to fine gravel of ryolite, quartz, obidian, subangular to subrounded sand.					
335-340 CLAY, tan with trace sand grains.					
340°		340°			
150°		150°			

340' - 351' CLAY, tan, firm, slightly calcareous. 351.4-386.0 VARIED CLAY, horizontal band 1/16-1/4" waves of bright green plasmic clay grades to light gray silt, wavying more crude toward base.					
340' - 351' CLAY, tan, firm, slightly calcareous. 351.4-386.0 VARIED CLAY, horizontal band 1/16-1/4" waves of bright green plasmic clay grades to light gray silt, wavying more crude toward base.					
351.4-386.0 VARIED CLAY, horizontal band 1/16-1/4" waves of bright green plasmic clay grades to light gray silt, wavying more crude toward base.					
386.0-406.5 BASALT, gray to reddish brown, traces of fine feldspar, vesicular to 393.4'; dense to 406.7'; vesicular to 408.0-411.0; dense to 1006.5, gray color-banded below 999.9'.					
406.0-406.5 BASALT, gray to reddish brown, traces of fine feldspar, vesicular to 393.4'; dense to 406.7'; vesicular to 408.0-411.0; dense to 1006.5, gray color-banded below 999.9'.					

PROJECT: Lemhi Basin Division

SHEET 2



LOG OF WELL

GAGIET YDE

### SAMPLE TYPE

**PROJECT** **TOURNAMENT** **REGISTRATION** - Return Resin Protect  
**BAND**

WELL NO. 8M/40E-21dd1  
(Site # 6)

## BUREAU OF RECLAMATION - REGION 1

SHEET 1 OF 2

**LOG OF WELL**

Project Lower Teton Division		Feature Exploration Drill Hole (Piezometers)		Game Farm Area Site Idaho	
Well No. 7N-3SE-13aa1 (Site 13)		(Approx. 980' south, 475' west, sec. corner)		Location SE NE sec. 13, T1N, R3SE, Jefferson County	
Total Depth 1000.7	Begun 9/1/69	Completed 10/4/69	Drilling Method Cable tool to 50'; diamond core to 1000';	Date --	Date --
Static Water Level See below	(above) Meas. Pt. (below)				
Elevation (ground) 4789.50	W. L. Meas. Pt. ( )				
Yield --	Drawdown --				
Logged By G. I. Hascett	Other Data Driller, Inspector, and Geologist reports	Cape Drilling and Pump Co.	Cape Drilling and Pump Co.	Geophysical Log Gamma	Geophysical Log Gamma
Drilling Data Pump Tests Water Samples	Description of Well Completion	Drilling Data Pump Tests Water Samples	Description of Well Completion	Geophysical Log Gamma	Geophysical Log Gamma
Under Specs. No. 1000-1060	4" csg. 14"	Log	Log	Well Diagram	Well Diagram
Cable tool to 50'; wireline diamond drill core; 50'-1000.7';					
NP, top 14" csg. 4791.67	Piezo. pipes... 5' of perforations starting 25' above bottom of pipe				
Elev. Piezo. top of pipe	A(3/4") 4790.54 B(3/4") 4790.72 C(3/4") 4790.81 D(1") 4791.07				
Depth to water 10/22/69	Piez. 0.39' Pipe "D" 1.35 (for water level) in upper hole				
Piez. 0.92	325' Q perfs.				
<u>Surface Detail</u>					
Top 14" csg. 4791.67	14" csg. Insulated with zones (A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z)				
Ground Surface 4789.50	Gravel				
SAMPLE TYPE:	CLAY				
CF = Cuttings Log	GRAVEL				
CD = Core Log	SAND				
DR = Driller's Log	BASALT				

PROJECT Lower Teton Division - Teton Basin Project  
WELL NO. 7N-3SE-13aa1

## BUREAU OF RECLAMATION - REGION 1

SHEET 2 OF 2

**LOG OF WELL**

Project Lower Teton Division		Feature Exploratory Drill Hole (Piezometers)		Game Farm Area Site Idaho	
Well No. 7N-3SE-13aa1 (Site 13)		(Approx. 980' south, 475' west, sec. corner)		Location SE NE sec. 13, T1N, R3SE, Jefferson County	
Total Depth 1000.7	Begun 10/9/69	Completed 10/6/69	Drill to 50'; diamond core to 1000';	Date --	Date --
Static Water Level --	(above) Meas. Pt. (below)	(above)	(below)	Meas. Pt. ( )	W. L. Meas. Pt. ( )
Elevation (ground) 4789.50	W. L. Meas. Pt. ( )				
Yield --	Drawdown --				
Logged By G. I. Hascett	Other Data Driller, Inspector, and Geologist reports	Cape Drilling and Pump Co.	Cape Drilling and Pump Co.	Geophysical Log Gamma	Geophysical Log Gamma
Drilling Data Pump Tests Water Samples	Description of Well Completion	Drilling Data Pump Tests Water Samples	Description of Well Completion	Geophysical Log Gamma	Geophysical Log Gamma
Under Specs. No. 1000-1060	4" csg. 14"	Log	Log	Well Diagram	Well Diagram
Cable tool to 50';					
wireline diamond					
drill core;					
50'-1000.7';					
Top gravel, 3'					
NP, top 14" csg. 4791.67	Piezo. pipes... 5' of perforations starting 25' above bottom of pipe				
Elev. Piezo. top of pipe	A(3/4") 4790.54 B(3/4") 4790.72 C(3/4") 4790.81 D(1") 4791.07				
Depth to water 10/22/69	Piez. 0.39' Pipe "D" 1.35 (for water level) in upper hole				
Piez. 0.92	325' Q perfs.				
<u>Surface Detail</u>					
Top 14" csg. 4791.67	14" csg. Insulated with zones (A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z)				
Ground Surface 4789.50	Gravel				
SAMPLE TYPE:	CLAY				
CF = Cuttings Log	GRAVEL				
CD = Core Log	SAND				
DR = Driller's Log	BASALT				

PROJECT Lower Teton Division - Teton Basin Project

WELL NO. 7N-3SE-13aa1 SITE 13

## LOG OF WELL

Project	Lower Teton Division	Feature	Exploratory Hole & Placerunner Bank	State	Idaho
Well No.	2M/38E-23d#3 (Site 4)	Location	Approx. 1440 ft. West and 730 ft. South of NE Corner section 21, T. 7 N., R. 36 E., B.M.		
Total Depth	632.5 ft.	Began	6/10/67	Completed	6/26/67
Static Water Level	40 ft. (General)	Meds. Pr.	Original ground	Drilling Method	Diamond drill & chain
Elevation (Ground)	4859.9	(above) W.L. Meds. Pr.	See below	Total Depth	632.5 ft.
Yield	Drawdown			Begin	6/10/67
Logged By	H. H.	Geophysical Log	See geologic log book, driller's, and Inspector's Other Data reports, and seismograph logs.	Static Water Level	40 ft. (general)
		Gamma & Gamma-Grav.	Gamma & Gamma-Grav.	Elevation (ground)	4859.9
		by M.R.T.S./H.S.G.E.	by M.R.T.S./H.S.G.E.	Yield	Drawdown
		Drilled By Justice Core Drilling Co.	Drilled By Justice Core Drilling Co.	Logged By	H. H.
				Geophysical Log	Geophysical Log
				Other Data	Other Data
				Completion	Completion
				Drillers Log	Drillers Log
				Core Cuttings Log	Core Cuttings Log
				Drillers Log	Drillers Log

## LOG OF WELL

Project	Lower Teton Division	Feature	Exploratory Hole & Placerunner Bank	State	Idaho
Well No.	2M/38E-23d#3 (Site 4)	Location	Approx. 1440 ft. West and 730 ft. South of NE Corner section 21, T. 7 N., R. 36 E., B.M.		
Total Depth	632.5 ft.	Began	6/10/67	Completed	6/26/67
Static Water Level	40 ft. (General)	(above) Meds. Pr.	Original ground	Drilling Method	Diamond drill & chain
Elevation (Ground)	4859.9	W.L. Meds. Pr.	See below	Total Depth	632.5 ft.
Yield	Drawdown			Begin	6/10/67
Logged By	H. H.	Geophysical Log	See geologic log book, driller's, and Inspector's Other Data reports, and seismograph logs.	Static Water Level	40 ft. (general)
		Gamma & Gamma-Grav.	Gamma & Gamma-Grav.	Yield	Drawdown
		by M.R.T.S./H.S.G.E.	by M.R.T.S./H.S.G.E.	Logged By	H. H.
		Drilled By Justice Core Drilling Co.	Drilled By Justice Core Drilling Co.	Geophysical Log	Geophysical Log
				Other Data	Other Data
				Completion	Completion
				Drillers Log	Drillers Log
				Core Cuttings Log	Core Cuttings Log
				Drillers Log	Drillers Log

Total depth = 632.5 ft.

Classification and Physical Condition

Drilling Data	Bump Points	Description of Well Completion	Well Diagram	Classification and Physical Condition
Water Samples				
Churn drill hole to 201.5 ft.	3 1/8" I.D.			
Bored 1958.				
Pipes installed in the hole and twisted at well bottom.				
Spuds 100C-329 Obs. Well 12B Diamond drill				
Elevations:				
Top of 14" coupling "				
cord hole				
201.5 to 632.5 ft.				
Spuds 100C-320				
Bottom of 14" coupling "				
Top of 14" concrete -				
Plano A - 4860.32 ft.				
B - 4860.44				
C - 4860.67				
Water-surface elevations				
8/26/67 5" Casing 4819.64 ft. Casing 4816.06 ft.				
B - 4815.93 ft.				
C - 4815.51 ft.				
181' 10" Hole				
Temp. 4" Casing				
201.5' 8" Hole				
Water sample taken from adjacent well 213d#1 - 6/22/67				
pH - 7.48				
S.C. 24.9e/0.6				
Bar - 0.68				
Surface details				
Plane C N.P. 8" Casing	293' Gravel			
A				
concrete slab	313' Grout			
	320' Perforations			
	Placerunner C			
3.2' Casing				
3.2' Casing	395.0 Temp. Casing			
	400'			
	426' Gravel			
	451' Grout			
	470' Perforations			
	Placerunner B			
	500'			

## LOG OF WELL

Project	Lower Teton Diversion	Feature	Observation Well	Location	Approx. 600 ft. East and 1/4 (Well A) and 1/4 (Well B) North of east corner section 1, T. 7 N., R. 32 E., J.R.M.	State	Idaho
Well No.	7/39-loc1 (Well A) Site 5					(Well B)	
Total Depth	122 ft.	Began	6/29/67	Completed	7/5/67	Drilling Method	Air Core
Static Water Level	72.5 ft. - 49.0 ft.	(above)	Meas. Pt. Original stand	Date	8/6/67		
Elevation (ground)	4894.3	(below)	W. L. Meas. Pt. sea level				
Yield	Drawdown	Other Data	See driller's and inspector's reports				
Logged By	Driller	Geophysical Log				Drilled By	Cope Drilling Co. By Maxxane Core Drilling Co.
Drilling Data	Pump Test	Description of Well				Classification and Physical Condition	
Water Samples	Completion	Diagram A	Log	Diagram B	Log	Diagram C	Log
Drilled under Specs.	100C-920	Fudged surface seal	19' 6" I.D. Cas.			0' - 16.0' - TOPSOIL and SAND.	
Under-surface elevation 8/5/67	55' 8" Hole					16.0' - 55.0' - BASALT and CINDER; red and grey.	
Well A - 4891.9	64.1' I.D. Cas. w/shoe					55.0' - 68.0' - CLAY; soft.	
Well B - 4875.3	122' 8" hole					68.0' - 122.0' - BASALT and CINDER; grey.	
						Total depth = 122 ft.	
						Cinder zones shown by vertical ticks on log.	
						Elevations	
						Well A - Top of Cas. - 4904.86	
						Well B - Top of Cas. - 4905.41	

SAMPLE TYPE:

BED

CLAY

BASALT &amp;

CINDER

PROJECT Lower Teton Diversion - Teton Basin Project

WELL NO. 7/39-loc1  
(site 5)

LOG OF WELL									
Project	Lower Teton Division	Feature	Tent Well	State	Idaho				
Well No.	TM/10E-1S-21 (Tent Well 2)	Location	Approx. 1.5 ft. North and 200 ft. West of the Corner Section 15,						
Total Depth	394.7	Began	5/9/68	Completed	8/2/68	Drilling Method	Cable tool	Date	7/31/68
Static Water Level	308.8 ft.	(below)	Mean P. 200 ft. of sea level, S. side.						
Elevation (ground)	4871.0	W.L. Meas.	Pt. 4888.01						
Yield See Below	Drawdown See below	Other Data	See driller's and inspector's reports and geologic						
Logged By H. K. K.	Geophysical Log								
Drilled By R. C. Denton									
Drilling Data	Description	Well Diagram	Log	Geological	Geological	Classification and Physical Condition			
Drilled under Water Samples	3 ft. in. hole 0.0 to 40 ft. 3 ft. in. diam. 2 to 40, cement grout 2 to 40					0.0 to 12 SAND, GRAVEL AND COBBLES, rounded to subangular basalt, quartzite and silicic vol- canic up to 150 mm., basalt and quartz sand increasing with depth, silty 30-40%.			
Spec. 1000 gpm Developed by sur- facing with test pump for 10 hrs. at 5000 gpm max.	30 in. hole 40 to 124, 30 in. temp. 0 to 124°, 27 in. hole 124° to 160.					42 to 51 BASALT, light gray, sparsitic, mostly dense, olivine-bearing			
Step downhole test 7/30/68, Mich.	24 in. O.D. 5000 3000 2.31 3000 3.83 5000 5.76					51 to 52 SAND AND GRAVEL, similar to that at 0-12.			
1000 gpm 0.69 ft.	24 in. O.D. 5000 3000 2.31 3000 3.83 5000 5.76					52 to 112 BASALT, gray, brown, reddish, apoph- itic, dense to highly vesicular, olivine-bearing. Driller reports sand 120-123.			
Continuous test 90 min. per step Coastal Test test 7/31/68 - 8/2/68.	15 ft. 160, Factor show at 160. 160					142 to 153 SILTY SAND, reddish brown, fine to coarse grained, principally subrounded to sub- angular quartz and silicic volcanic rocks			
23 in. hole 160 to 180.5	23 in. hole 160 to 180.5					153 to 154 BASALT, similar to 52 to 112. Thin zone of SILTY SAND near 175-180			
Transmissibility 2.6 X 10 <sup>3</sup> ft. <sup>2</sup> /sec. (1.7 to 2.9 X 10 <sup>-3</sup> ft./sec.)	20 in. O.D. 312 wall liner 11.5 2.7 X 10 <sup>3</sup> ft. <sup>2</sup> /sec. (1.7 to 2.9 X 10 <sup>-3</sup> ft./sec.)					164 to 197 SILTY SAND, reddish-brown, fine- grained, principally quartz.			
near surface details 1 ft. in. pipe	24 in. O.D. 24 24 in. O.D.					197 to 236 BASALT, gray, lathy with few pheno- crysts grading to sparsitic, dense to aciculose olivine-bearing			
Coefficient of storage - less than 1.0 X 10 <sup>-5</sup>						236 to 261 SANDY SILT, reddish-brown, fine to coarse grained quartz and basalt sand, numerous fragments of basalt and alteration material.			
Quality sample 8/1/68						261 to 302 BASALT, gray, sparsitic, dense to vesicular olivine-bearing,			
pH - 7.96 Spec. Cond. - 290 X 10 <sup>-6</sup> mho B - 0.06 ppm HCO <sub>3</sub> - 2.89 mm./l. Na/K - 0.03 Ca/Mg - 0.12 mm./l. SAR - 0.34						302 to 307 SANDY SILT, dark brown, fine grained quartz and basalt sand, numerous basalt frag- ments and alteration material.			
Sediment after Pumping C.Y. for 18 hrs. - less than 0.01 m.	3 ft. in. eng. Bottom of 19 in. hole.					307 to 394.7 BASALT, gray, reddish, sparsitic, dense to saccular, olivine-bearing, much al- teration material at 394			
						394.7 - Total Depth			
SAMPLE TYPE									
G.C. = Core Cuttings	CLAY								
G.T. = Cuttings Log		SELF							
D. Driller's Log			GRAN.						
				GRAVEL					
PROJECT Lower Teton Division									
WELL NO. TM/10E-1S-21									
(Tent Well 2)									

## BUREAU OF RECLAMATION

SECTION

## LOG OF WELL

SHEET 1 OF 1

LOG OF WELL									
Project Lower Division		Feature Observation Wells at Test Well Site 2							
Well No.	Location	Address:		State:		Idaho			
1000-10-10-10-10-10	Location:	12.1 A. 1/4 Sect. 10, T. 10 N., R. 20 E., West of the S. & N.		West of the S. & N.		State: Idaho			
Total Depth	Began	3/26/68		Completed	5/7/68	Drilling Method	Cable tool		
Static Water Level	Below	(above) Mads. Pt. See below		(Below) Mads. Pt. See below		Date			
Elevation (ground)	Avg 55.1	W. L. Meas. Pt. See below		W. L. Meas. Pt. See below		Yield			
Yield	None	Drawdown		Other Data		Logged By	Ralph C. Denton Drilling Co.		
LOGGED BY TEST WELL 2									
Drilling Data	Description	Well	Top	Bottom	Depth	Log	Geological Log	Core Log	Classification and Physical Condition
Pump Tests	Water Samples	Well	20	20	20	0	0	0	Refer to log of Well TM/100-10-10-10-10 (Test Well 2) for approximate classification and physical condition. Drilled log at left taken from Well TM/100-10-10-10-10.
Drillings under Speeds - 1000-558	Spade - 1000-558	8 in. / 2 ft wall	20	20	20	0	0	0	
Powered by engines with belt.	Powered by engines with belt.	8 in. / 2 ft wall	20	20	20	0	0	0	
Starting with motor.	Starting with motor.	8 in. / 2 ft wall	20	20	20	0	0	0	
Assembly 9.0 ft.	Assembly 9.0 ft.	8 in. / 2 ft wall	20	20	20	0	0	0	
20.5 ft. #12 slot	20.5 ft. #12 slot	8 in. / 2 ft wall	20	20	20	0	0	0	
18.5 ft. lead welded	18.5 ft. lead welded	8 in. / 2 ft wall	20	20	20	0	0	0	
seal, lead plates	seal, lead plates	8 in. / 2 ft wall	20	20	20	0	0	0	
Device.	Device.	8 in. / 2 ft wall	20	20	20	0	0	0	
#12 0.0-4857-1	#12 0.0-4857-1	8 in. / 2 ft wall	20	20	20	0	0	0	
8 in. top of eng. -	8 in. top of eng. -	8 in. / 2 ft wall	20	20	20	0	0	0	
7/31/68, 3.11	7/31/68, 3.11	8 in. / 2 ft wall	20	20	20	0	0	0	
(SL 4854.91),	(SL 4854.91),	8 in. / 2 ft wall	20	20	20	0	0	0	
Radius - 31.8 ft.	Radius - 31.8 ft.	8 in. / 2 ft wall	20	20	20	0	0	0	
Wall 2A	8 in. / 2 ft wall	8 in. / 2 ft wall	20	20	20	0	0	0	
10 in. hole 0 to	10 in. hole 0 to	8 in. / 2 ft wall	20	20	20	0	0	0	
102, 10 in. comp-	102, 10 in. comp-	8 in. / 2 ft wall	20	20	20	0	0	0	
oles. 0 to 11.	oles. 0 to 11.	8 in. / 2 ft wall	20	20	20	0	0	0	
(C-10-3 remanu-	(C-10-3 remanu-	8 in. / 2 ft wall	20	20	20	0	0	0	
ling + 0.7 to	ling + 0.7 to	8 in. / 2 ft wall	20	20	20	0	0	0	
1001, 8 in. hole	1001, 8 in. hole	8 in. / 2 ft wall	20	20	20	0	0	0	
102 to 335, 6 in.	102 to 335, 6 in.	8 in. / 2 ft wall	20	20	20	0	0	0	
eng. + 0.9 to	eng. + 0.9 to	8 in. / 2 ft wall	20	20	20	0	0	0	
114, 6 in. 235 (4)	114, 6 in. 235 (4)	8 in. / 2 ft wall	20	20	20	0	0	0	
#12 0.0-4856-3	#12 0.0-4856-3	8 in. / 2 ft wall	20	20	20	0	0	0	
8 in. top of 6 in.	8 in. top of 6 in.	8 in. / 2 ft wall	20	20	20	0	0	0	
eng. - 4857-17,	eng. - 4857-17,	8 in. / 2 ft wall	20	20	20	0	0	0	
7/31/68,	7/31/68,	8 in. / 2 ft wall	20	20	20	0	0	0	
Radius - 31.0 ft.	Radius - 31.0 ft.	8 in. / 2 ft wall	20	20	20	0	0	0	

SAMPLE TYPE:

CLAY

SAND

BED

TA BIAKE

SILT

GRANULE

PROJECT

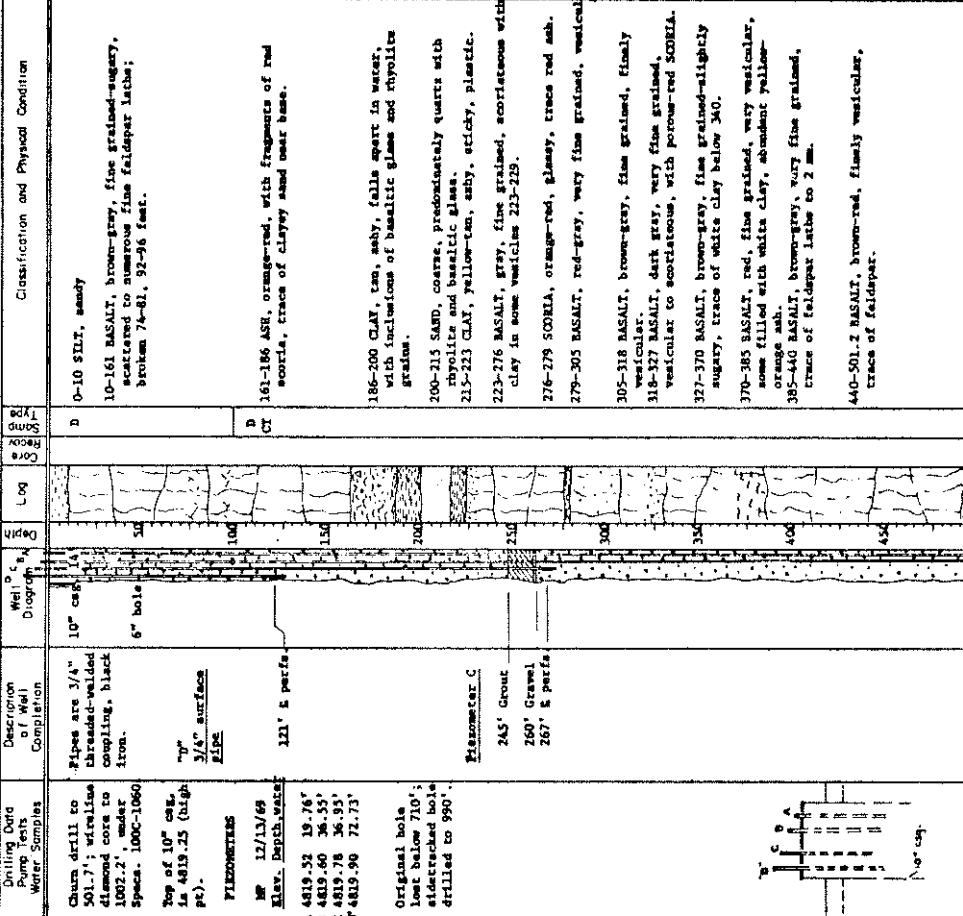
TEST WELLS  
ON WELLS 2A, 2B,  
Gm. Wells 2A, 2B

## LOG OF WELL

Project Name	Fox River Division	Feature Exploratory Hole and Placerometer Bank	State	Idaho	
Avg. Sec. No.	462	West and 76 <sup>o</sup> North of E. & L. Corner	Location		
Total Depth	399.5 ft.	Began	6/2/67	Completed	6/2/67
Static Water Level	36 ft.	Below	Muds, PI, Original around (below)	Drilling Method	Churn & Rotary Drill
Elevation (ground)	4824.6 ft.	W. L. Muds, PI	Top of M <sup>n</sup> Island	Date	6/6/67
Yield in feet	Drilled down	Geologic Survey Log book, driller's, and Inspector's Other Data	Sample, and geographical logs	Comments	
Logged By	I. Rompe	Sediment	Core	Core	Drilled By Justice Core Drilling Co.
Driving Tools	Dump trucks	Well Number	Log	Log	Classification and Physical Condition
Water Samples		Completion	Diagram	Diagram	
Churn drill hole	Three 1/2" dia. 0.0" - 125.5"	3.1' Placerometer Pipes installed as shown.			6.0' <sup>1</sup> - 0' - SILTY SAND AND GRAVEL.
Stainless steel core drill core hole	125.5' - 399.5'	Elevation top of 3/4" Placerom- eters			8.0' <sup>1</sup> - 37.0' <sup>1</sup> - SAND.
Under Spec.	100C-920	Piano A 4824.30 B 4824.20 C 4824.10			37.0' <sup>1</sup> - 64.0' <sup>1</sup> - SAND GRAVEL.
Soil-surface collections	9/5/67	B.P. to concrete base 4825.10			66.0' <sup>1</sup> - 102.0' <sup>1</sup> - SAND.
Piano A 4830.10 B 4831.20 C 4840.30	63'	Groove			103.0' <sup>1</sup> - 126.3' <sup>1</sup> - BASALT; medium gray.
Water sample	125.5'	78' Gravel			124.3' <sup>1</sup> - 171.0' <sup>1</sup> - BASALT; streaks red-purple to gray, subangular, rounded to dense, jointed to massive.
Time:	53 17.6	Placerometer C E of 3' pos- tions			171.0' <sup>1</sup> - 177.8' <sup>1</sup> - SANDY SILT; light brown.
Cond.	162 Rad 0	90.0'			177.8' <sup>1</sup> - 222.0' <sup>1</sup> - BASALT; medium gray, equigranular (1 mm), moderately vesicular to dense; jointed to massive.
		169' Groove			222.0' <sup>1</sup> - 228.0' <sup>1</sup> - SILTY GRAVEL; moderate pink, basaltic.
		220' Gravel			228.0' <sup>1</sup> - 262.0' <sup>1</sup> - BASALT; grayish red-purple to gray, equigranular, highly vesicular to slightly vesicular, jointed to massive.
		235.0'			262.0' <sup>1</sup> - 277.0' <sup>1</sup> - GRAVEL, SILTY GRAVEL; brown to gray, basaltic.
		C Placerometer B E of 3' pos- tions			277.0' <sup>1</sup> - 302.8' <sup>1</sup> - BASALT; streaks red-purple to gray, equigranular (1 mm), subangular, and highly to moderately jointed.
		356' Gravel			302.8' <sup>1</sup> - 312.0' <sup>1</sup> - GRAVEL.
		378' Gravel			312.0' <sup>1</sup> - 349.0' <sup>1</sup> - BASALT; streaks red-purple to gray, pyroxitic plagioclase crystals to 10 mm, subangular to vesicular, highly to slightly jointed.
		Placerometer A E of 3' pos- tions			349.0' <sup>1</sup> - 399.6' <sup>1</sup> - IRIDIUM ROCK; reddish-orange to light orange, welded tuff or rhyolite morphology with quartz and plagioclase phenocrysts to 3 mm; highly vesicular 369.0' - 355.7'; green to fresh rock 351.0'.
		391.5'			399.6'
		concrete slab			
		356' Groove			
		378' Gravel			
		Placerometer A E of 3' pos- tions			
		391.5'			
		concrete slab			
		356' Groove			
		378' Gravel			
		Placerometer A E of 3' pos- tions			
		391.5'			
		concrete slab			
		356' Groove			
		378' Gravel			
		Placerometer A E of 3' pos- tions			
		391.5'			
		concrete slab			
		356' Groove			
		378' Gravel			
		Placerometer A E of 3' pos- tions			
		391.5'			
		concrete slab			
		356' Groove			
		378' Gravel			
		Placerometer A E of 3' pos- tions			
		391.5'			
		concrete slab			
		356' Groove			
		378' Gravel			
		Placerometer A E of 3' pos- tions			
		391.5'			
		concrete slab			
		356' Groove			
		378' Gravel			
		Placerometer A E of 3' pos- tions			
		391.5'			
		concrete slab			
		356' Groove			
		378' Gravel			
		Placerometer A E of 3' pos- tions			
		391.5'			
		concrete slab			
		356' Groove			
		378' Gravel			
		Placerometer A E of 3' pos- tions			
		391.5'			
		concrete slab			
		356' Groove			
		378' Gravel			
		Placerometer A E of 3' pos- tions			
		391.5'			
		concrete slab			
		356' Groove			
		378' Gravel			
		Placerometer A E of 3' pos- tions			
		391.5'			
		concrete slab			
		356' Groove			
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		391.5'			
		concrete slab			
		356' Groove			
		378' Gravel			
		Placerometer A E of 3' pos- tions			
		391.5'			

LOG OF WEI

Project Lamar Taconite Division Feature Exploratory Drill Hole State Idaho  
 Well No. SH-205 - 11 ab1 (Site 11) Location NE 1/4 Section 11, T-16, R-36 (Montevue Area)  
 Total Depth 1002.2 Begun 7/20/69 Completed 9/29/69 Drilling Method Cone Core 0'-500' 1'-1000' 2'  
 Static Water Level see below (above) Mts. Pt. see below Date —  
 Elevation (ground) 481.90 W.L. Mean, ft. —  
 Yield — Drawdown —  
 Geophysical Log gamma, density, temperature —  
 Logged By G. J. Handelt Other Driller, Inspector reporter, Geological Well Reporters, Electric, Diller, Gourton, Gamma  
Drilled By and Justice Core Drilling

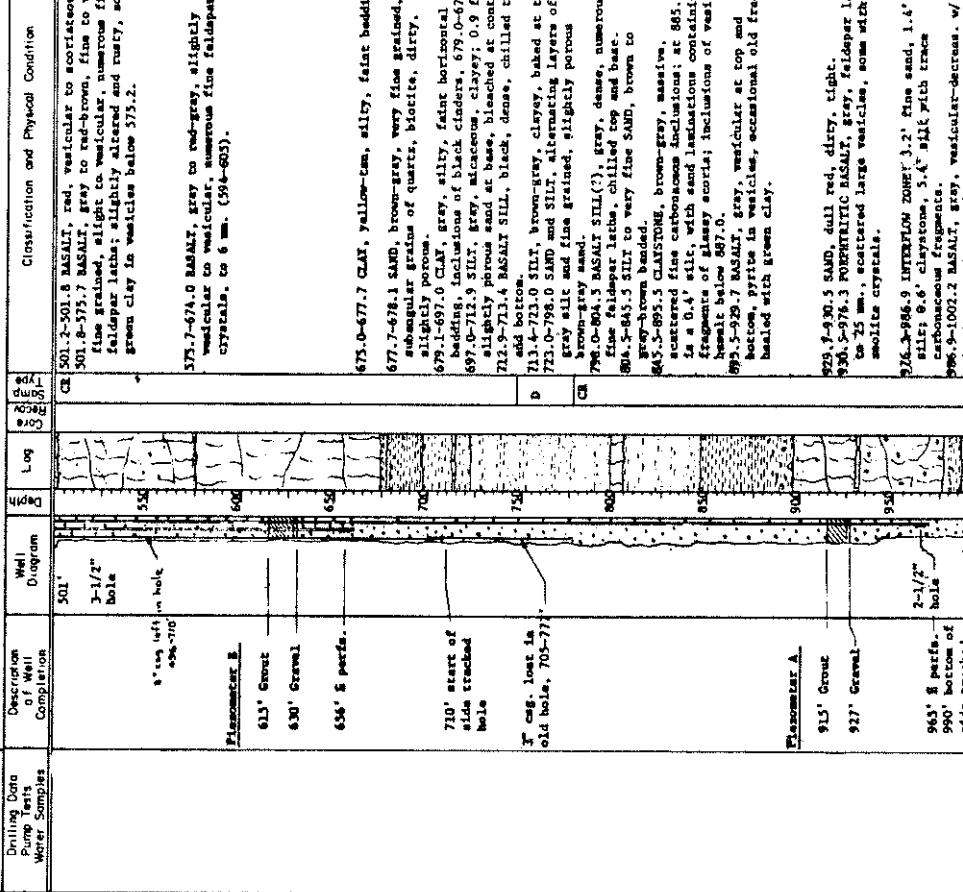


PROJECT: Team Noddy  
SAMPLE TYPE: G-100  
G-100 Log  
G-100  
SITE: 11

BUREAU OF RECLAMATION - REGION 1

100 OEWEI

Project	Lower Teton Division	Feature	Exploratory Drill Hole	State	Idaho
Well No.	SH-262 - 11 ab1 (Site 11)	Location	NE 1/4 Section 11, Twp. 10S, Range 10E (Montaineer Area)	Table Tool U-500	
Total Depth	1002.2	Began	7/10/69	Completed	9/25/69
Static Water Level				Drilling Method	Core 215
Elevation (ground)	4817.90	(above)	Muds	Core	500-1000
Yield	—	(below)	Pi	Date	—
Logged By	G. L. Eastcott	Other	Dipmeter, Induction, Resistivity, Gamma Log, Temperature	Geological Well Log Electric, Dipmeter, Gamma Log, Temperature Geophysical Log Geological Log	



## BUREAU OF RECLAMATION - REGION 1

SHEET 1 OF 2

## LOG OF WELL

Project - Lower Teton Division		Feature - Exploratory Drill Hole, South and 250 ft. East of the State - Idaho		Project - Lower Teton Division		Feature - Exploratory Drill Hole, Approx. 150 ft. South and 250 ft. East of the Location - At corner Sec. 29, T. 6 N., R. 37 E. (U.S. Land)	
Well No.	6N/37E-29-3 (Expl. Hole 9)	Well No.	6N/37E-29A (Expl. Hole 9)	Total Depth	573 ft.	Location	At corner Sec. 29, T. 6 N., R. 37 E. (U.S. Land)
Static Water Level	573 ft.	Drilling Method	Cable Tool	Total Depth	573 ft.	Completed	9/5/68
Elevation (ground)	4823.4	(above) Meas. Pt.	(below) Meas. Pt.	Begin	9/5/68	Drilling Method	Cable Tool
Yield		Other Data	Geologist's and Inspector's reports and Geiger Counter Log	Static Water Level	See below	(above) Meas. Pt.	Date
Logged By	H. H. H.	Geophysical Log	Geophysical Log by Geophysical Co.	Elevation (ground)	4823.4	W. L. Meas. Pt.	W. L. Meas. Pt.
Drilling Dang	Description	Well Log	Completion	Drawdown	Yield	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Dump Test	Completion	Well Diagram	Water Samples	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Water Samples	Specs. 100C-1003	0.0 to 21.0 ft.	0.0 to 21.0 ft.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Borehole	Unstarted drive	16 in. O.D.	0.0 to 4 - SILTY SAND, tan, fine-grained.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Specs. 100C-1003	samples taken by double tube sampler attached to drill stem.	250 wall core + 0.8 to 21.0 ft. - barrel shoe.	4 to 65 - BASALT, gray and red, dense to vesicular.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Well	15 in. hole 21.	gray surface soil.	65 to 90 - SAND & GRAVEL, reddish-orange, quartz sand and basalt, oxidized, silicic volcanic and quartzite gravel up to 25m.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	Lab. analysis by U.S.G. Denver Hydrologic Lab. - Spec. - Potentiometer, specific, resist., vertical, vertical, and U.S.A. perme. and water test at 53 to 65 ft.	10 in. I.D. 250 wall core + 1.2 to 151.5 ft. - factory shoe 10 in. hole 175 to 40 ft.	90 to 144 - SAND, grayish tan, fine-grained quartz with numerous gravels, becomes silty and gray with depth.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	10 in. I.D. 250 wall core + 1.2 to 40 ft. - factory shoe 10 in. hole 175 to 40 ft.	144 to 165 - BASALT, dark gray, vesicular.	145 to 175 - SAND & GRAVEL, gray, quartz sand and basalt, oxidized and silicic volcanic gravel up to 25m.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	6 in. core 6 ft. E.P. - 4783.8	10 in. I.D. 250 wall core + 1.9 to 50 ft. - factory shoe 6 in. hole 440 to 573 ft.	175 to 238 - SAND, gray, fine-to-medium grained, mostly quartz and basalt, becomes tan, fine-grained and silty at 180' (C).	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	10 in. core 6 ft. E.P. - 4775.7	6 in. core 6 ft. E.P. - 4783.8	200 to 260 - BASALT, dark gray, dense.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	16 in. core 6 ft. E.P. - 4779.5	6 in. core 6 ft. E.P. - 4783.8	260 to 285 - SAND, gray, fine-grained, silty, coarser and clearer, 275 to 280 and very silty 280 - 285.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	3 in. capped pipe	10 in. core 6 ft. E.P. - 4783.8	285 to 354 - SILTY CLAY, gray, firm, becomes sandy at 300, sandy and silty at 310.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	16 in. core 6 ft. E.P. - 4779.5	10 in. core 6 ft. E.P. - 4783.8	355 to 375 - BASALT, dark gray, dense.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	16 in. core 6 ft. E.P. - 4779.5	10 in. core 6 ft. E.P. - 4783.8	375 to 405 - BASALT, reddish-gray, highly vesicular to scoriaceous, last all cuttings 380 - 405.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	16 in. core 6 ft. E.P. - 4779.5	10 in. core 6 ft. E.P. - 4783.8	405 to 415 - BASALT, light gray, dense.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	16 in. core 6 ft. E.P. - 4779.5	10 in. core 6 ft. E.P. - 4783.8	415 to 445 - VOLCANIC BRECCIA, reddish gray, basaltic, apparently vesicular basalt and scoria fragments in vesicular mud-like matrix.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	16 in. core 6 ft. E.P. - 4779.5	10 in. core 6 ft. E.P. - 4783.8	445 to 469 - BASALT, reddish-gray, dense to scoriaceous, last all cuttings 445 to 450, 455 to 469.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	16 in. core 6 ft. E.P. - 4779.5	10 in. core 6 ft. E.P. - 4783.8	469 to 513 - VOLCANIC BRECCIA, red, brown, gray, basaltic, loose clinders, scoria and obsidian, lost most of cuttings.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	16 in. core 6 ft. E.P. - 4779.5	10 in. core 6 ft. E.P. - 4783.8	513 to 517 - SILIT, orange, sandy, lightly indurated, underlain by SAND, tan, fine-grained quartz.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	16 in. core 6 ft. E.P. - 4779.5	10 in. core 6 ft. E.P. - 4783.8	517 to 553 - BASALT, gray, vesicular interbedded with VOLCANIC BRECCIA, red and gray, apparently clinders and scoria, lost most of cuttings.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	16 in. core 6 ft. E.P. - 4779.5	10 in. core 6 ft. E.P. - 4783.8	553 - 573 - VOLCANIC BRECCIA, reddish, basaltic, apparently vesicular basalt and scoria in granular, mud-like matrix, clinders near bottom, lost many cuttings.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	16 in. core 6 ft. E.P. - 4779.5	10 in. core 6 ft. E.P. - 4783.8	573 - TOTAL DEPTH	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.

SHEET 2 OF 2

## LOG OF WELL

Project - Lower Teton Division		Feature - Exploratory Drill Hole, Approx. 150 ft. South and 250 ft. East of the Location - At corner Sec. 29, T. 6 N., R. 37 E. (U.S. Land)		Project - Lower Teton Division		Feature - Exploratory Drill Hole, Approx. 150 ft. South and 250 ft. East of the Location - At corner Sec. 29, T. 6 N., R. 37 E. (U.S. Land)	
Well No.	6N/37E-29-3 (Expl. Hole 9)	Well No.	6N/37E-29A (Expl. Hole 9)	Total Depth	573 ft.	Completed	12/17/68
Static Water Level	573 ft.	Drilling Method	Cable Tool	Total Depth	573 ft.	Completed	9/5/68
Elevation (ground)	4823.4	(above) Meas. Pt.	(below) Meas. Pt.	Begin	9/5/68	Drilling Method	Cable Tool
Yield		Other Data	Geologist's and Inspector's reports and Geiger Counter Log	Static Water Level	See below	(above) Meas. Pt.	Date
Logged By	H. H. H.	Geophysical Log	Geophysical Log by Geophysical Co.	Elevation (ground)	4823.4	W. L. Meas. Pt.	W. L. Meas. Pt.
Drilling Dang	Description	Well Log	Completion	Drawdown	Yield	Geophysical Log	Geophysical Log
Dump Test	Completion	Well Diagram	Water Samples	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Water Samples	Specs. 100C-1003	0.0 to 21.0 ft.	0.0 to 21.0 ft.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Borehole	Unstarted drive	16 in. O.D.	0.0 to 4 - SILTY SAND, tan, fine-grained.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Specs. 100C-1003	samples taken by double tube sampler attached to drill stem.	250 wall core + 0.8 to 21.0 ft. - barrel shoe.	4 to 65 - BASALT, gray and red, dense to vesicular.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Well	15 in. hole 21.	gray surface soil.	65 to 90 - SAND & GRAVEL, reddish-orange, quartz sand and basalt, oxidized, silicic volcanic and quartzite gravel up to 25m.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	Lab. analysis by U.S.G. Denver Hydrologic Lab. - Spec. - Potentiometer, specific, resist., vertical, vertical, and U.S.A. perme. and water test at 53 to 65 ft.	10 in. I.D. 250 wall core + 1.2 to 151.5 ft. - factory shoe 10 in. hole 175 to 40 ft.	90 to 144 - SAND, grayish tan, fine-grained quartz with numerous gravels, becomes silty and gray with depth.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	10 in. I.D. 250 wall core + 1.2 to 40 ft. - factory shoe 10 in. hole 175 to 40 ft.	144 to 165 - BASALT, dark gray, vesicular.	145 to 175 - SAND & GRAVEL, gray, quartz sand and basalt, oxidized and silicic volcanic gravel up to 25m.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	6 in. core 6 ft. E.P. - 4783.8	10 in. core 6 ft. E.P. - 4783.8	175 to 238 - SAND, gray, fine-to-medium grained, mostly quartz and basalt, becomes tan, fine-grained and silty at 180' (C).	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	10 in. core 6 ft. E.P. - 4775.7	6 in. core 6 ft. E.P. - 4783.8	200 to 260 - BASALT, dark gray, dense.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	16 in. core 6 ft. E.P. - 4779.5	10 in. core 6 ft. E.P. - 4783.8	260 to 285 - SAND, gray, fine-grained, silty, coarser and clearer, 275 to 280 and very silty 280 - 285.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	16 in. core 6 ft. E.P. - 4779.5	6 in. core 6 ft. E.P. - 4783.8	285 to 354 - SILTY CLAY, gray, firm, becomes sandy at 300, sandy and silty at 310.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	16 in. core 6 ft. E.P. - 4779.5	10 in. core 6 ft. E.P. - 4783.8	355 to 375 - BASALT, dark gray, dense.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	16 in. core 6 ft. E.P. - 4779.5	6 in. core 6 ft. E.P. - 4783.8	375 to 405 - BASALT, reddish-gray, highly vesicular to scoriaceous, last all cuttings 380 - 405.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	16 in. core 6 ft. E.P. - 4779.5	10 in. core 6 ft. E.P. - 4783.8	405 to 415 - BASALT, light gray, dense.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	16 in. core 6 ft. E.P. - 4779.5	10 in. core 6 ft. E.P. - 4783.8	415 to 445 - VOLCANIC BRECCIA, reddish gray, basaltic, apparently vesicular basalt and scoria fragments in vesicular mud-like matrix.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	16 in. core 6 ft. E.P. - 4779.5	10 in. core 6 ft. E.P. - 4783.8	445 to 469 - BASALT, reddish-gray, dense to scoriaceous, last all cuttings 445 to 450, 455 to 469.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	16 in. core 6 ft. E.P. - 4779.5	10 in. core 6 ft. E.P. - 4783.8	469 to 513 - VOLCANIC BRECCIA, red, brown, gray, basaltic, loose clinders, scoria and obsidian, lost most of cuttings.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	16 in. core 6 ft. E.P. - 4779.5	10 in. core 6 ft. E.P. - 4783.8	513 to 517 - SILIT, orange, sandy, lightly indurated, underlain by SAND, tan, fine-grained quartz.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	16 in. core 6 ft. E.P. - 4779.5	10 in. core 6 ft. E.P. - 4783.8	517 to 553 - BASALT, gray, vesicular interbedded with VOLCANIC BRECCIA, red and gray, apparently clinders and scoria, lost most of cuttings.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.
Completion	16 in. core 6 ft. E.P. - 4779.5	10 in. core 6 ft. E.P. - 4783.8	553 - 573 - VOLCANIC BRECCIA, reddish, basaltic, apparently vesicular basalt and scoria fragments in granular, mud-like matrix.	Geophysical Log	Geophysical Log	Geophysical Log by Geophysical Co.	Geophysical Log by Geophysical Co.

PROJECT

Lower Teton Division

SAMPLE TYPE

CLAY

SAND

GRAVEL

SILT

CINDER, SCORIA, ETC.

CROWN

PROJECT Lower Teton Division

WELL NO. 6N/37E-29-A-1

Expl. Hole 9

NO. 6N/37E-29-A-1

Expl. Hole 9

## BUREAU OF RECLAMATION

## SHEET 2 OF 2 BUREAU OF RECLAMATION - REGION 1 LOG OF WELL

## Project Lower Teton Division

Feature Test Well  
Well No. 67-385-2-Seal (Test Well 1)  
Location E. N. R. 38 E.  
Total Depth 685 ft.

Static Water Level 18.05 ft.  
Elevation (ground) 4825.4  
Yield See Below

Logged By E. Bas  
Drilled By Core Drilling & Pump Co.  
Pump Data  
Pump Type  
Water Samples

Burried under  
Spec. 100C-958  
by Denton, sub.  
by Cope Cable  
rotary 40-259, ca-  
ble tool 269-65.  
The previous holes 39  
in hole 11  
to 269, 30 in.  
eg. 1.0 to 269.  
Developed by sur-  
veying with test  
pump for 2.5 hrs.  
1 in pipe steel  
Sediment reduced  
to 0.05 ml. at  
5000 gpm. max.  
Stop drilling  
test 6/15/68  
Ditch. Dl.  
1100 gpm 0.25 ft.  
2000 0.70  
3100 1.50  
1150 2.55  
515 3.75  
Continuous test  
-120 min. per  
step.

Constant 7144  
test 6/16/68 -  
6/16/68.  
Transmissibility  
1.2 ft. 103 to 2.1  
 $(1.2 \text{ to } 3.3) \times$   
 $10 \text{ gal/sec}^2/\text{ft}^2$ .  
Coefficient of stor-  
age - long 10  
 $1.0 \times 10^3$ .

Quality sample  
6/17/68  
Spec. Conc. 4.69  
X 10 into 3.  
0.06 gm. HCO<sub>3</sub>  
4.69 0.6  
(-) 0.56 meq/l.  
SAR 0.15 meq/l.

Project Lower Teton Division  
Feature Test Well  
Well No. 67-385-2-Seal (Test Well 1)  
Location E. N. R. 38 E.  
Total Depth 685 ft.  
Static Water Level 18.05 ft.  
Elevation (ground) 4825.4  
Yield See Below

Logged By E. Bas  
Drilled By Core Drilling & Pump Co.  
Pump Data  
Pump Type  
Water Samples

Spec. 100C-958  
by Denton, sub.  
by Cope Cable  
rotary 40-259, ca-  
ble tool 269-65.  
The previous holes 39  
in hole 11  
to 269, 30 in.  
eg. 1.0 to 269.  
Developed by sur-  
veying with test  
pump for 2.5 hrs.  
1 in pipe steel  
Sediment reduced  
to 0.05 ml. at  
5000 gpm. max.  
Stop drilling  
test 6/15/68  
Ditch. Dl.  
1100 gpm 0.25 ft.  
2000 0.70  
3100 1.50  
1150 2.55  
515 3.75  
Continuous test  
-120 min. per  
step.

Constant 7144  
test 6/16/68 -  
6/16/68.  
Transmissibility  
1.2 ft. 103 to 2.1  
 $(1.2 \text{ to } 3.3) \times$   
 $10 \text{ gal/sec}^2/\text{ft}^2$ .  
Coefficient of stor-  
age - long 10  
 $1.0 \times 10^3$ .

Quality sample  
6/17/68  
Spec. Conc. 4.69  
X 10 into 3.  
0.06 gm. HCO<sub>3</sub>  
4.69 0.6  
(-) 0.56 meq/l.  
SAR 0.15 meq/l.

Project Lower Teton Division  
Feature Test Well  
Well No. 67-385-2-Seal (Test Well 1)

## SHEET 1 OF 2 BUREAU OF RECLAMATION - REGION 1 LOG OF WELL

## Project Lower Teton Division

Feature Test Well  
Appx. 2180 ft. West and 1900 ft. South of the NE Corner Section 25

Location E. N. R. 38 E.  
Total Depth 685 ft.

Static Water Level 18.05 ft.  
Elevation (ground) 4825.4  
Yield See Below

Logged By E. Bas  
Geophysical Log  
Other Data Field Log

Description  
of Well  
Completion  
Drillings  
Pump Tests  
Water Samples

Classification and Physical Condition

8.0 to 5 STONY SANDY TAN  
5 to 13 SLATE; dark gray, spumitic, dense to  
weathered, olive-bearing  
13 to 18 SAND; gray, fine-grained, basalts and  
quartz with silicic volcanics, few gravels.  
18 to 39 BASALT; dark gray, spumitic, dense,  
olivine-bearing,  
39 to 65 SAND AND GRAVEL; sub-round to sub-  
angular obsidian porphyry with basalts and other  
silicic volcanics, decreasing obsidian and in-  
creasing quartz sand content with depth.

65 to 165 SAND; gray, fine to coarse grained,  
quartz and silicic volcanics with basalts and other  
silicic volcanics, decreasing obsidian and in-  
creasing quartz sand content with depth.

165 to 185 SLATE CLAY; tan, plastic, sticky,  
184 to 195 SLATE CLAY; gray, plastic, sticky  
195 to 202 SLATE SAND; tan, very fine-grained  
muddy quartz,  
201 to 226 SLATE; tan, medium to coarse grained,  
quartz with silicic volcanics, few gravels  
possibly partly cemented.

226 to 259 SAND; tan and gray, very fine to  
fine grained, silicic volcanics with silicic vol-  
canics, silty top and bottom  
259 to 269 SILICSTONE; tan, sandy, moderately in-  
durated, distinct bedding planes upper part,  
contains angular fragments of dark gray, vesicu-  
lar basalt 260-269  
269 to 300 (?) BASALT; dark gray, spumitic,  
dense to moderately vesicular, olivine bearing

300 (?) to 345 SAND AND SAND AND GRAVEL; tan;  
interbedded fine to coarse quartz sand, sub-  
rounded to sub-angular silicic volcanic gravel  
345 to 400 (?) SLATE SAND; tan fine to medium  
grained quartz with basalts  
400 (?) to 435 SLATE STONE; tan, contains very  
fine grained quartz sand.  
435 to 670 (?) BASALT; gray to brown to red,  
spumitic, dense to scoriaceous, olivine bearing

WELL NUMBER 67-385-2-Seal  
PROJECT Lower Teton Division

SAMPLE TYPE  
CLAY  
SAND  
SLATE  
GRAVEL

LOG  
Core  
Coring  
Drillings Log  
Drillings

TEST WALL 1

SAMPLE TYPE  
CLAY  
SAND  
SLATE  
GRAVEL

LOG  
Core  
Coring  
Drillings Log  
Drillings

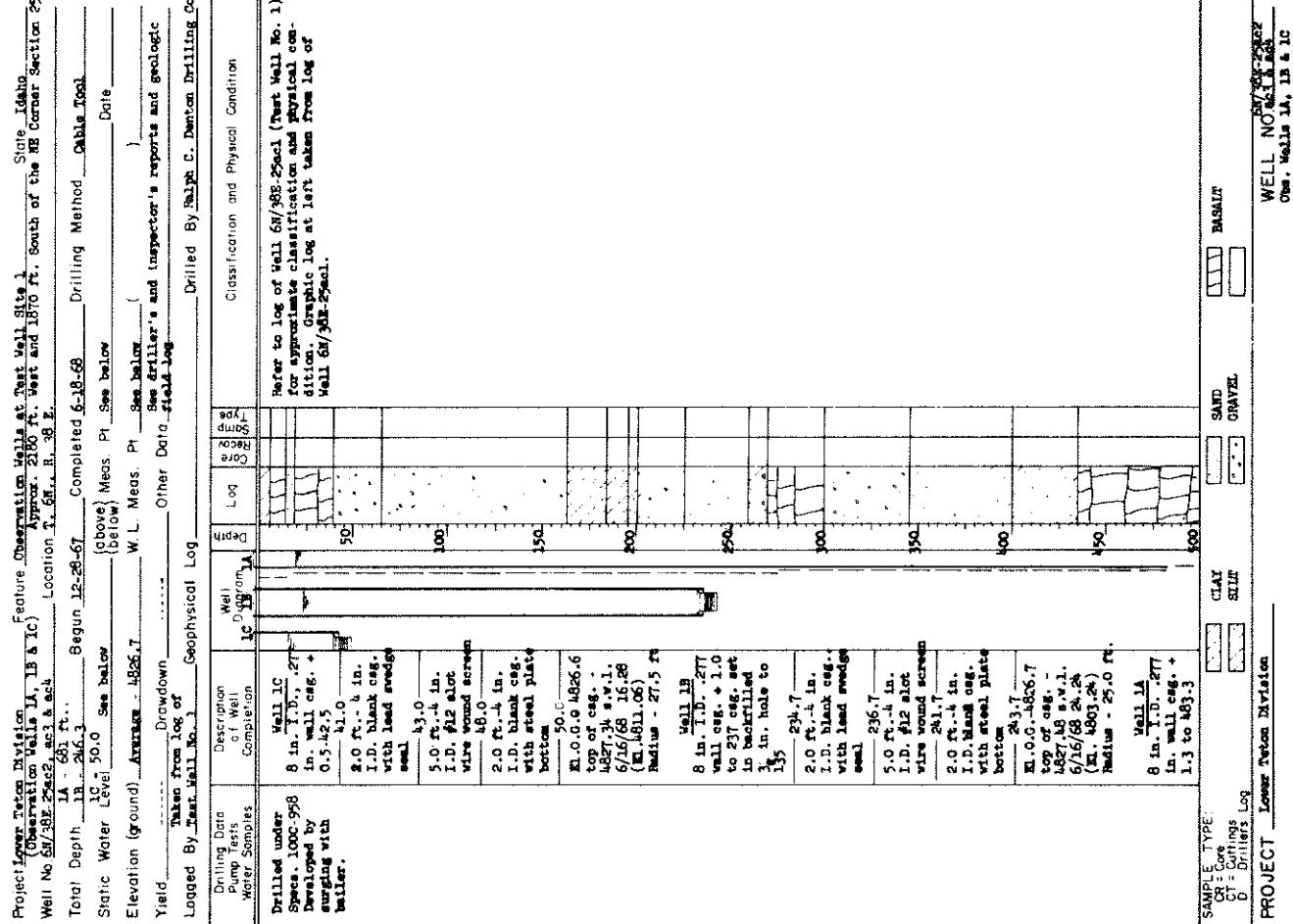
TEST WALL 1

WELL NO. 67-385-2-Seal  
TEST WALL 1

## BUREAU OF RECLAMATION REGION 1

## SHEET 1 OF 2 BUREAU OF RECLAMATION LOG OF WELL

Project Lower Teton Division Observation Wells 1A, 1B & 1C	Feature Observation Wells at Test Well Site 1	State Idaho
Well No 561-387-2 Mac2, sec 3 & 4d	Approx. 2180 ft. West and 1870 ft. South of the NE Corner Section 25	Location T. 6N. R. 38E.
Total Depth 1A - 631 ft... 1B - 246.3 ft... Static Water Level 50.0 ft. See below	Began 12-28-67 Completed 6-18-68 Drilling Method Cable Tool	Total Depth 1A - 246.3 ft... Begin 12-28-67 Completed 6-18-68 Drilling Method Cable Tool
Elevation (ground) ...Altitude - 4826.7 ft. Yield -----	Yield -----	Elevation (ground) ...Altitude - 4826.7 ft. Yield -----
Logged By Ralph C. Denton Drilling Co	Geophysical Log -----	Logged By Ralph C. Denton Drilling Co
Other Data Field Log -----	Other Data Field Log -----	Other Data Field Log -----
Drilled By Ralph C. Denton Drilling Co	Geophysical Log -----	Geophysical Log -----
Drilling Date Pump Tests Water Samples	Drilling Date Pump Tests Water Samples	Drilling Date Description of Well Completion
Completion	IC Diagram	IC Diagram
Description of Well	Well I.A.	Well I.A.
Drilled under Pump Sources	IC Diagram	IC Diagram
Specs .1000-598 Developed by emering with baller.	Well I.C. 8 in. I.D. In. wall csg. + 0.5 in. 2.5 in. I.D. blank csg. with lead wedge seal.	Well I.C. 8 in. I.D. In. wall csg. + 0.5 in. 2.5 in. I.D. blank csg. with lead wedge seal.
8.0 ft. - 4 in. I.D. blank csg. with lead wedge seal.	50	50
13.0 ft. - 4 in. I.D. blank csg. with lead wedge seal.	100	100
5.0 ft. - 4 in. I.D. blank csg. with lead wedge seal.	150	150
2.0 ft. - 4 in. I.D. blank csg. with steel plate bottom	200	200
8.0 ft. - 4 in. I.D. blank csg. with lead wedge seal.	250	250
8.0 ft. - 4 in. I.D. blank csg. with lead wedge seal.	300	300
5.0 ft. - 4 in. I.D. blank csg. with lead wedge seal.	350	350
2.0 ft. - 4 in. I.D. blank csg. with steel plate bottom	400	400
8.0 ft. - 4 in. I.D. blank csg. with lead wedge seal.	450	450
8.0 ft. - 4 in. I.D. blank csg. with lead wedge seal.	500	500



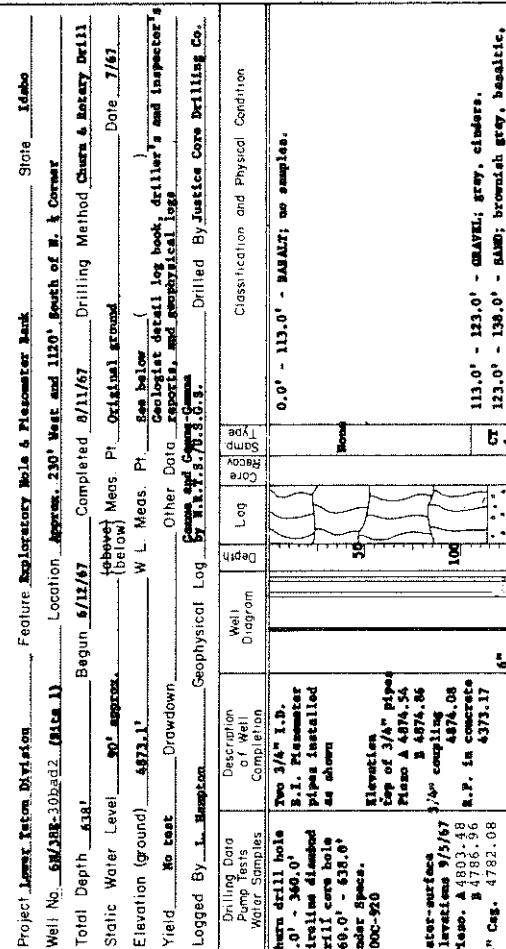
## SHEET 2 OF 2 BUREAU OF RECLAMATION LOG OF WELL

Project Lower Teton Division Feature Observation Wells at Test Well Site 1	Feature Observation Wells 1A, 1B & 1C	State Idaho
Well No 561-387-2 Mac2, sec 3 & 4d	Approx. 2180 ft. West and 1870 ft. South of the NE Corner Section 25	Location T. 6N. R. 38E.
Total Depth 1A - 631 ft... 1B - 246.3 ft... Static Water Level 50.0 ft. See below	Began 12-28-67 Completed 6-18-68 Drilling Method Cable Tool	Total Depth 1A - 246.3 ft... Begin 12-28-67 Completed 6-18-68 Drilling Method Cable Tool
Elevation (ground) ...Altitude - 4826.7 ft. Yield -----	Yield -----	Elevation (ground) ...Altitude - 4826.7 ft. Yield -----
Logged By Ralph C. Denton Drilling Co	Geophysical Log -----	Logged By Ralph C. Denton Drilling Co
Other Data Field Log -----	Other Data Field Log -----	Other Data Field Log -----
Drilled By Ralph C. Denton Drilling Co	Geophysical Log -----	Geophysical Log -----
Drilling Date Pump Tests Water Samples	Drilling Date Pump Tests Water Samples	Drilling Date Description of Well Completion
Completion	IC Diagram	IC Diagram
Sample Type:	CLAY	CLAY
CR = Core	SAND	SAND
CF = Cuttings	GRAVEL	GRAVEL
DD = Drillers Log	STONE	STONE
PROJECT Lower Teton Division	WELL NO. 561-387-2 Mac2	WELL NO. 561-387-2 Mac2
One Well 1A, 1B & 1C	One Well 1A, 1B & 1C	One Well 1A, 1B & 1C

## BUREAU OF RECLAMATION - REGION 1

## SHEET 1 OF 2

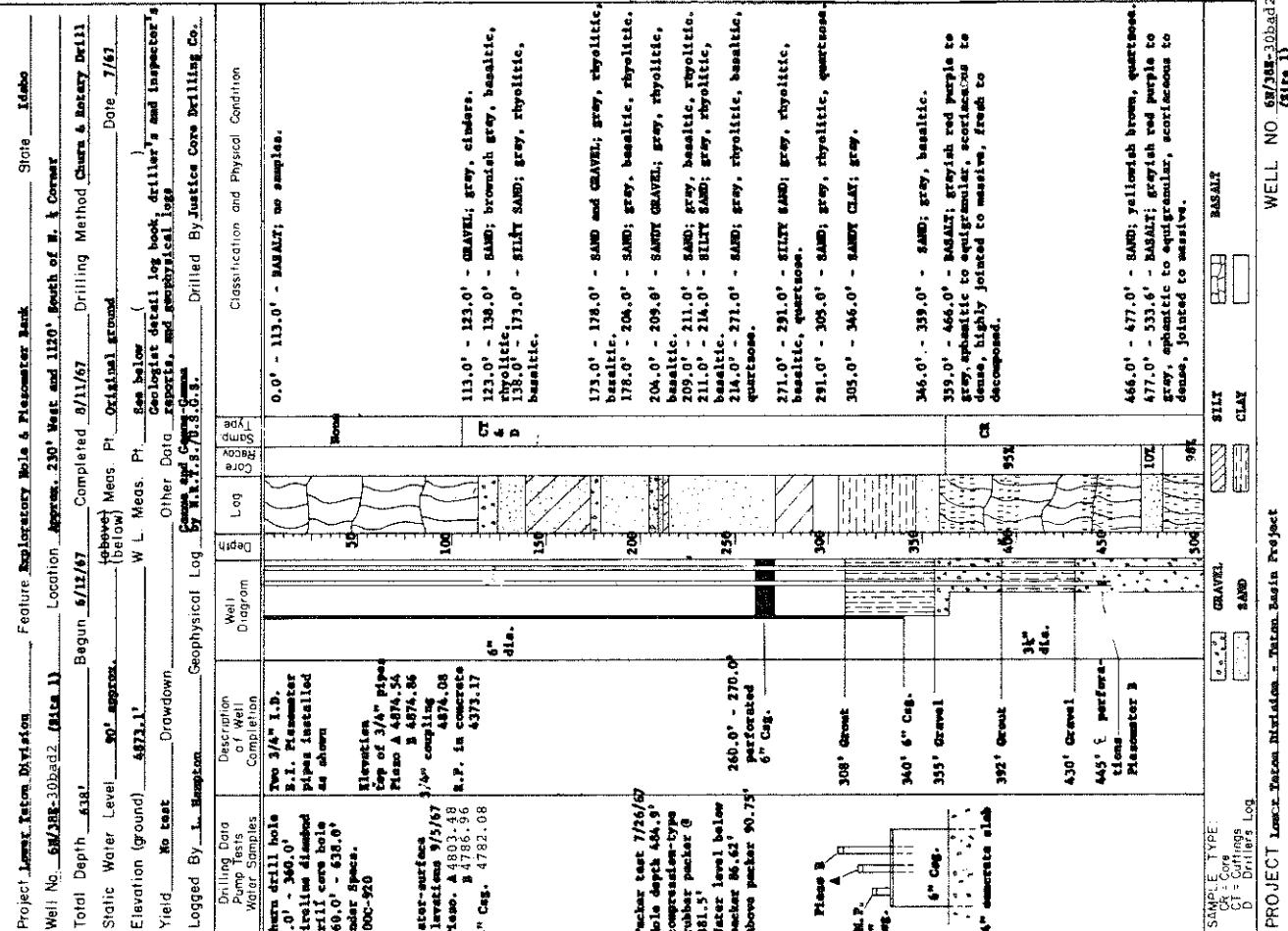
## LOG OF WELL



## BUREAU OF RECLAMATION - REGION 1

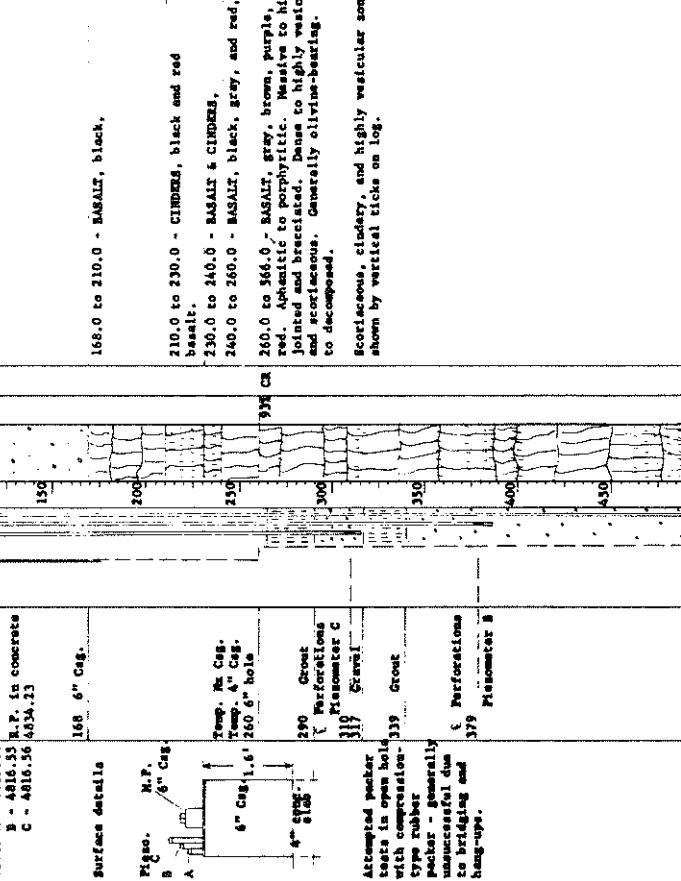
## SHEET 2 OF 2

## LOG OF WELL



LOG OF WEEL

Project	Tenor Division	Feature	Exploratory Hole and Placerbank Bank	State	Idaho
Well No. #MAY-1001 (Site 3)	Approx. 500 ft. East and 150 ft. South of Hwy 39	Location	Canyon Section 10, T. 6 N., R. 39 E., B. M.	Method	Vibration diamond
Total Depth 346.4 ft.	Began 5/24/67	Completed 6/18/67	Drilling Method	drill & cutters	Date 6/18
Static Water Level 112.3 ft. (approx.)	(below) Meas. Pt. Original ground	gas seepage below	gas seepage hole, drillar's and investigator's		
Elevation (ground) 343.0	Drawdown	Other Dolo-rocks and geological logs	Causes and Causes-Causes		
Yield 50 gpm	Geophysical Log Ax.W.E. 1/2 S. Az. 80°	Drilled By	Maria Cara Drillers		
Logged By M. Bass					
Drilling Date	Pump Test	Description	Well Program	Classification and Physical Condition	
Churn drift holes	Water Samples	0 Well Completion			
to 260.0 ft.		Three 3/4" I.D.			
Spilled 1942.		B. 1. Placerbank			
Specs. 1000-937		pipes installed			
		as shown in the			
		hole and existing			
		" wall			
Material dammed		drill cuttings!			
drill cuttings		Top at 34"			
Spills. 1000-930		coupling "			
Specs. 1000-930		4836.00			
		Top of 34" pipe			
Water-surface		Piso A-4353.94			
elevations -		B-4352.22			
		8/26/67			
		6/26/67			
		Piso A A-4316.56			
		C-4316.52			



## BUREAU OF RECLAMATION - REGION 1

## SHEET 1 OF 2 BUREAU OF RECLAMATION - REGION 1

## LOG OF WELL

## Feature Driller's Hole and Preameter Hole

State Idaho

Location Approx. 60° North &amp; 119° West of the N. &amp; Corner

Well No. 607-392-30adcl-Site 7) Well No. 607-392-30adcl-Site 7)

Total Depth 699.7' Begun 7/10/67 Total Depth 699.7' Begun 7/10/67

Static Water Level 1.8' Drilling Method Rotary

Elevation (ground) 4815.8' (see drilling data)

Yield test 1.8' (below) Meas. Pt. Drill bit ground

Logged By L. Sampson Date 9/5/67

Drillers Log (see drilling data)

Other Data Reports, and Geophysical Logs

Comments and General Summary

Geophysical Log by R.E.T.S.R.G.

Drilled By Justice Core Drilling Co.

Drilling Tools Pump Test Water Samples

Original private well 30 ft. i.d. water well 295.0' deep. Drilled by J. Alexander 1962.

Maximum diameter drill core hole top of 3/4" pipes 295.0' - 699.7' Piso A 4818.92' Piso B 4819.12' Spec. 100C-320 Top of 1" coupling 4819.92'

No pump test Water-surface elevation 9/ 5/67

Phase A 4815.36', B 4815.42', C 4817.05'

6" Cap. 6" Cap. A 6" Cap. B

200' 165.0' - 165.0' - CLAY; BROWN.

165.0' - 170.0' - CLAY; BROWN.

170.0' - 200.0' - GRAVEL AND SAND; cemented.

200.0' - 250.0' - SAND; brown.

250.0' - 262.0' - PIA GRAVEL AND SANDY YELLOW CLAY.

262.0' - 292.0' - LAVA; BROWN.

292.0' - 295.0' - LAVA.

295.0' - 345.0' - SAND; light gray, rhombitic, basalitic, quartzeous.

345.0' - 384.35' - LAVA; SILTY SAND; light gray, rhombitic, basalitic, quartzeous.

384.35' - 413.15' - BASALT; gray to grayish red purple, amphibitic, highly vesicular to dense, jointed to massive, olivine common.

413.15' - 431.25' - BASALT; gray to grayish red purple, amphibitic, highly vesicular to dense, jointed to massive, olivine common.

431.25' - 447.15' - BASALT; gray to grayish red purple, amphibitic, highly vesicular to dense, jointed to massive.

447.15' - 500' - CLAY.

500' - 530' - CLAY.

530' - 550' - CLAY.

550' - 600' - CLAY.

SAMPLE TYPE  
 D = Core  
 CT = Cuttings Log  
 D = Driller's Log

PROJECT Lower Teton Division - Teton Basin Project

WELL NO. 607-392-30adcl

Site 7

GRATEL
SAND
CLAY

GRATEL
SAND
CLAY

GRATEL
SAND
CLAY

GRATEL
SAND
CLAY

WELL NO. 607-392-30adcl

Site 7

## SHEET 2 OF 2 BUREAU OF RECLAMATION - REGION 1

## LOG OF WELL

## Feature Driller's Hole and Preameter Hole

State Idaho

Location Approx. 60° North &amp; 119° West of the N. &amp; Corner

Well No. 607-392-30adcl-Site 7) Well No. 607-392-30adcl-Site 7)

Total Depth 699.7' Begun 7/10/67 Total Depth 699.7' Begun 7/10/67

Static Water Level 1.8' Drilling Method Rotory

Elevation (ground) 4815.8' (see drilling data)

Yield test 1.8' (below) Meas. Pt. Drill bit ground

Logged By L. Sampson Date 9/5/67

Drillers Log (see drilling data)

Other Data Reports, and Geophysical Logs

Comments and General Summary

Geophysical Log by R.E.T.S.R.G.

Drilled By Justice Core Drilling Co.

Drilling Tools Pump Test Water Samples

Original private well 30 ft. i.d. water well 295.0' deep. Drilled by J. Alexander 1962.

Maximum diameter drill core hole top of 3/4" pipes 295.0' - 699.7' Piso A 4818.92' Piso B 4819.12' Spec. 100C-320 Top of 1" coupling 4819.92'

No pump test Water-surface elevation 9/ 5/67

Phase A 4815.36', B 4815.42', C 4817.05'

6" Cap. 6" Cap. A 6" Cap. B

200' 165.0' - 165.0' - CLAY; BROWN.

165.0' - 170.0' - CLAY; BROWN.

170.0' - 200.0' - GRAVEL AND SAND; cemented.

200.0' - 250.0' - SAND; brown.

250.0' - 262.0' - PIA GRAVEL AND SANDY YELLOW CLAY.

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431.25' - 447.15' - BASALT; gray to grayish red purple, amphibitic, highly vesicular to dense, jointed to massive, olivine common.

447.15' - 500' - CLAY.

500' - 530' - CLAY.

530' - 550' - CLAY.

550' - 600' - CLAY.

GRATEL
SAND
CLAY

GRATEL
SAND
CLAY

WELL NO. 607-392-30adcl

Site 7

## SHEET 2 OF 2 BUREAU OF RECLAMATION - REGION 1

## LOG OF WELL

## Feature Driller's Hole and Preameter Hole

State Idaho

Location Approx. 60° North &amp; 119° West of the N. &amp; Corner

Well No. 607-392-30adcl-Site 7) Well No. 607-392-30adcl-Site 7)

Total Depth 699.7' Begun 7/10/67 Total Depth 699.7' Begun 7/10/67

Static Water Level 1.8' Drilling Method Rotory

Elevation (ground) 4815.8' (see drilling data)

Yield test 1.8' (below) Meas. Pt. Drill bit ground

Logged By L. Sampson Date 9/5/67

Drillers Log (see drilling data)

Other Data Reports, and Geophysical Logs

Comments and General Summary

Geophysical Log by R.E.T.S.R.G.

Drilled By Justice Core Drilling Co.

Drilling Tools Pump Test Water Samples

Original private well 30 ft. i.d. water well 295.0' deep. Drilled by J. Alexander 1962.

Maximum diameter drill core hole top of 3/4" pipes 295.0' - 699.7' Piso A 4818.92' Piso B 4819.12' Spec. 100C-320 Top of 1" coupling 4819.92'

No pump test Water-surface elevation 9/ 5/67

Phase A 4815.36', B 4815.42', C 4817.05'

6" Cap. 6" Cap. A 6" Cap. B

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165.0' - 170.0' - CLAY; BROWN.

170.0' - 200.0' - GRAVEL AND SAND; cemented.

200.0' - 250.0' - SAND; brown.

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447.15' - 500' - CLAY.

500' - 530' - CLAY.

530' - 550' - CLAY.

550' - 600' - CLAY.

GRATEL
SAND
CLAY

GRATEL
SAND
CLAY

WELL NO. 607-392-30adcl

Site 7

OG OF WEEK

Environ Biol Fish (2007) 79:169–174

ERONEGET Snake Plate Recharge

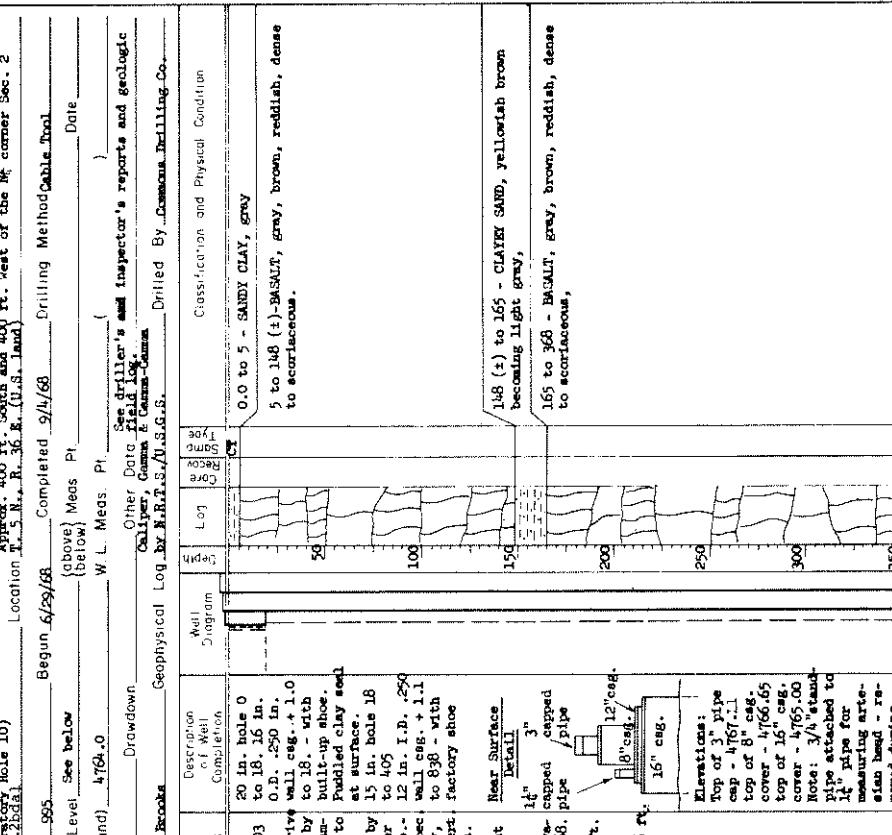
PROJECT SNAKE PLATE READER

106 OF WEI!

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LOG OF WiFi

Project Lower Teton Division Feature Exploratory Drill Hole Short section N and S State Idaho



SAMPLE	TYPE	Des. No.	Sample	CLAY	SAND	GRAVEL	BAISAL <sup>1</sup>	CHEM. & TUFF	WELL NO. 507-268-250d
CR-1	Core								
CR-2	Cuttings								
CR-3	Drillers Log								

LOG OF WiFi

Section	Feature	Exploratory Drill Hole Short section N and S	State Idaho
America	East	South and East	West of the corner 36° 2'
Brown	East	North and South	East of the corner 36° 2'

Geophysical Hole 10		Location 5.1 N., R. 36 E. (U.S. Land)		Completed 9/1/68		Drilling Method		Cable Tool	
Total Depth	Yield	Static Water Level	Began	(above) Mts. Pt.	(below) Mts. Pt.	Other Data	Drilled By	Reported by	Date
995	4165.0	995	Drawdown	W. L. Meas. Pt.	W. L. Meas. Pt.	Other Data from Log by M.R.C.S. (U.S.G.S.)	Geophysical Log by M.R.C.S. (U.S.G.S.)	Inspector's Report and Geologic	9/1/68
Logged By P. Brooks	Drilled By Continuous Drilling Co.								
Drilling Data	Description	Well Completion	Well Diagram	Core Type	Log	Core Log	Classification and Physical Condition	Condition	
Pump Tests	830 to 923.	12 in. hole 8 in. I.D. in csg. + 2.6 to 985 - with factory sleeve	830	DS					
Water Samples			550	DS					
			600	DS					
			650	DS					
			700	DS					
			750	DS					
			800	DS					
			850	DS					
			900	DS					
			950	DS					
			1000	DS					
			Bottom of 8 in. hole 995	CLAY	CLAY	SILT	SAND		
				CR	CORE	DRILLER'S LOG	DRILLER'S LOG	DRILLER'S LOG	
				CT	CUTTINGS	CUTTINGS	CUTTINGS	CUTTINGS	
				D	DRILLER'S LOG	DRILLER'S LOG	DRILLER'S LOG	DRILLER'S LOG	

WELL NO. 10  
Repl. Hole # 10

## BUREAU OF RECLAMATION - REGION 1

## SHEET 1 OF 2

## LOG OF WELL

Project	Snake Plain Recharge	Feature	Exploratory Drill Hole - West of Roberts	Site	Idaho
Well No.	SN 35E 14aa (Site 15)	Location	NESE1/4 sec. 14, T. 4 N., R. 35 E., Jefferson County	State	Idaho
Total Depth	1000.0'	Began	7/29/69	Completed	7/29/69
Air Rotor Drill and Core Drill		Drilling Method	11/1/69	Began	7/29/69
Static Water Level	406.8'	Bottom	below	[above]	Ground
Elevation (ground)	493.66'	Meds. Pt.	East Side - top of 6" casing	W.L. Meds. Pt.	Ground
Yield	0.60	Elevation (ground)	493.66'	W.L. Meds. Pt.	Ground
Logged By	G. L. G.	Yield Rate	Drawdown	Other Data	Geologist's detailed logbook, drilling notes, conductance, temperature, gamma-ray, geophysical data, and 2D geological lines.
Geophysical Log	Conductance, temperature, gamma-ray, geophysical data, and 2D geological lines.	Geophysical Log	Conductance, temperature, gamma-ray, geophysical data, and 2D geological lines.	Cone Drilling Co.	Cone Drilling Co. Drilled By
Geophysical Log	Geophysical Log	Geophysical Log	Geophysical Log	Geophysical Log	Geophysical Log
Drilling Date	Description	Depth	Description	Depth	Classification and Physical Condition
Pump Tests	Completion	Water Samples	Completion	Water Samples	(Continued from page 1)
Water Samples					
Ordrilled under	Well Diagram	Log	Well Diagram	Log	
Specs. 100-1060	Scale 1:20'	10.0' - 12.0' - CLAY AND SILT, STONE,	500.0' -	500.0' -	
0' to 500.0' -	D	broken and fractured.	D	D	
Air Rotor drilled 1060.0'	500.0' -		500.0' -	500.0' -	
0.0' to 500.0' by	500.0' -		500.0' -	500.0' -	
Cone Drilling Co.	500.0' -		500.0' -	500.0' -	
no samples.	500.0' -		500.0' -	500.0' -	
Cone drilled	500.0' -		500.0' -	500.0' -	
500.0' to 1006.0'	500.0' -		500.0' -	500.0' -	
" core hung and	500.0' -		500.0' -	500.0' -	
hung to pro-	500.0' -		500.0' -	500.0' -	
ject recorder	500.0' -		500.0' -	500.0' -	
by Justice Care	500.0' -		500.0' -	500.0' -	
Drilling Co.	500.0' -		500.0' -	500.0' -	
500.0' to 630.0'	500.0' -		500.0' -	500.0' -	
Open hole 630.0' to 1000.0'.	630.0' -		630.0' -	630.0' -	
Top of 8" cas-	630.0' -		630.0' -	630.0' -	
elev. 1940.26.	630.0' -		630.0' -	630.0' -	
Struck water at	630.0' -		630.0' -	630.0' -	
412.0' 7/31/69	630.0' -		630.0' -	630.0' -	
Standing water	630.0' -		630.0' -	630.0' -	
level 406.8'	630.0' -		630.0' -	630.0' -	
below top of	630.0' -		630.0' -	630.0' -	
casing 11/5/69	630.0' -		630.0' -	630.0' -	
Elevation	630.0' -		630.0' -	630.0' -	
453.5'	630.0' -		630.0' -	630.0' -	
corrigated cul-	630.0' -		630.0' -	630.0' -	
vert-type pipe	630.0' -		630.0' -	630.0' -	
shafter reentered	630.0' -		630.0' -	630.0' -	
down and installed	630.0' -		630.0' -	630.0' -	
upon completion	630.0' -		630.0' -	630.0' -	
as shown below.	630.0' -		630.0' -	630.0' -	
42"	630.0' -		630.0' -	630.0' -	
42" bottom of	630.0' -		630.0' -	630.0' -	
6" cas	630.0' -		630.0' -	630.0' -	
500.0' bottom of	630.0' -		630.0' -	630.0' -	
hole	630.0' -		630.0' -	630.0' -	
SAMPLE TYPE:	CLAY	CLAY	CLAY	CLAY	
OR = Core	SAND	SAND	SAND	SAND	
CT = Cuttings	GRAVEL	GRAVEL	GRAVEL	GRAVEL	
CD = Coring	SILT	SILT	SILT	SILT	
Drillers Log	LOG	LOG	LOG	LOG	
PROJECT	Snake Plain Recharge	Snake Plain Recharge	Snake Plain Recharge	Snake Plain Recharge	Snake Plain Recharge
WELL NO.	SN 35E 14aa	SN 35E 14aa	SN 35E 14aa	SN 35E 14aa	SN 35E 14aa
Site #	15	15	15	15	15

## LOG OF WELL

Project	Snake Plain Recharge	Feature	Exploratory Drill Hole - West of Roberts	Site	Idaho
Well No.	SN 35E 14aa (Site 15)	Location	NESE1/4 sec. 14, T. 4 N., R. 35 E., Jefferson County	State	Idaho
Total Depth	1000.0'	Began	7/29/69	Completed	7/29/69
Static Water Level	406.8'	Bottom	below	[above]	Ground
Elevation (ground)	493.66'	Meds. Pt.	East Side - top of 6" casing	W.L. Meds. Pt.	Ground
Yield	0.60	Elevation (ground)	493.66'	W.L. Meds. Pt.	Ground
Logged By	G. L. G.	Yield Rate	Drawdown	Other Data	Geologist's detailed logbook, drilling notes, conductance, temperature, gamma-ray, geophysical data, and 2D geological lines.
Geophysical Log	Conductance, temperature, gamma-ray, geophysical data, and 2D geological lines.	Geophysical Log	Conductance, temperature, gamma-ray, geophysical data, and 2D geological lines.	Cone Drilling Co.	Cone Drilling Co. Drilled By
Geophysical Log	Geophysical Log	Geophysical Log	Geophysical Log	Geophysical Log	Geophysical Log
Drilling Date	Description	Depth	Description	Depth	Classification and Physical Condition
Pump Tests	Completion	Water Samples	Completion	Water Samples	(Continued from page 1)
Water Samples					
Ordrilled under	Well Diagram	Log	Well Diagram	Log	
Specs. 100-1060	Scale 1:20'	10.0' - 12.0' - CLAY AND SILT, STONE,	500.0' -	500.0' -	
0' to 500.0' -	D	broken and fractured.	D	D	
Air Rotor drilled 1060.0'	500.0' -		500.0' -	500.0' -	
0.0' to 500.0' by	500.0' -		500.0' -	500.0' -	
Cone Drilling Co.	500.0' -		500.0' -	500.0' -	
no samples.	500.0' -		500.0' -	500.0' -	
Cone drilled	500.0' -		500.0' -	500.0' -	
500.0' to 1006.0'	500.0' -		500.0' -	500.0' -	
" core hung and	500.0' -		500.0' -	500.0' -	
hung to pro-	500.0' -		500.0' -	500.0' -	
ject recorder	500.0' -		500.0' -	500.0' -	
by Justice Care	500.0' -		500.0' -	500.0' -	
Drilling Co.	500.0' -		500.0' -	500.0' -	
500.0' to 630.0'	500.0' -		500.0' -	500.0' -	
Open hole 630.0' to 1000.0'.	630.0' -		630.0' -	630.0' -	
Top of 8" cas-	630.0' -		630.0' -	630.0' -	
elev. 1940.26.	630.0' -		630.0' -	630.0' -	
Struck water at	630.0' -		630.0' -	630.0' -	
412.0' 7/31/69	630.0' -		630.0' -	630.0' -	
Standing water	630.0' -		630.0' -	630.0' -	
level 406.8'	630.0' -		630.0' -	630.0' -	
below top of	630.0' -		630.0' -	630.0' -	
casing 11/5/69	630.0' -		630.0' -	630.0' -	
Elevation	630.0' -		630.0' -	630.0' -	
453.5'	630.0' -		630.0' -	630.0' -	
corrigated cul-	630.0' -		630.0' -	630.0' -	
vert-type pipe	630.0' -		630.0' -	630.0' -	
shafter reentered	630.0' -		630.0' -	630.0' -	
down and installed	630.0' -		630.0' -	630.0' -	
upon completion	630.0' -		630.0' -	630.0' -	
as shown below.	630.0' -		630.0' -	630.0' -	
42"	630.0' -		630.0' -	630.0' -	
42" bottom of	630.0' -		630.0' -	630.0' -	
hole	630.0' -		630.0' -	630.0' -	
SAMPLE TYPE:	CLAY	CLAY	CLAY	CLAY	
OR = Core	SAND	SAND	SAND	SAND	
CT = Cuttings	GRAVEL	GRAVEL	GRAVEL	GRAVEL	
CD = Coring	SILT	SILT	SILT	SILT	
Drillers Log	LOG	LOG	LOG	LOG	
PROJECT	Snake Plain Recharge	Snake Plain Recharge	Snake Plain Recharge	Snake Plain Recharge	Snake Plain Recharge
WELL NO.	SN 35E 14aa	SN 35E 14aa	SN 35E 14aa	SN 35E 14aa	SN 35E 14aa
Site #	15	15	15	15	15

## BUREAU OF RECLAMATION - REGION 1

## SHEET 1 OF 2 BUREAU OF RECLAMATION - REGION 1

## LOG OF WELL

Project Lower Teton Division

Feature Exploratory Drill Hole (Piezometers)

State Idaho

Well No. 4N/38E - 1261 (Site 14) Location H.W.M. Section 12, T. 4 N., R. 38 E., Jefferson County

Total Depth 1025.0 Completed 12/9/69 Drilling Method Diamond Core to 1025'

Static Water Level See below Date

Elevation (ground) 4829.55 (above) Meas. Pt. (below) W. L. Meas. Pt.

Yield Other Data, Driller, Inspector, and Geologist Reports

Geophysical Log Gamma, Gamma-Gamma, Neutron, Drilled By Justice Core Drilling Co.

Logged By G. I. Hassett

Geophysical Log Gamma, Gamma-Gamma, Neutron, Drilled By Justice Core Drilling Co.

Drillers Name

Depth of Well

Description of Well

Completion

Elev. of Top of Well

Elev. of bottom of well

Water Samples

Description of Well

Condition

0-10' Boulders

20-40' Gravel, with boulders

40-50' Gravel, medium to coarse

50'-105' Gravel, fine to medium

105-157' Gravel, coarse, with sand; cobbles 105-115 and 120-125; gravel and sand mixed with mud 150-155.

157-161' Gravel, medium

161-163' Gravel, coarse, with few boulders

63-178' Gravel, clayey

178-181' Gravel, coarse, and sand 181-190' Gravel, coarse, with sandy clay

190-204' Gravel, medium, with sand 204-225' Gravel, medium, with sand

225-248' Gravel, medium to coarse, with sand

248-256' Gravel, medium, with sand

256-269' Gravel, fine, sandy

269-276' Gravel, coarse, drilling up fine 275-280' Sand, coarse, gravelly

280-290' Gravel, and Sand

303-330' Gravel, coarse, with sand

330-333' Sand, coarse, with sand

331-342' Clay, brown, sticky at top, sandy toward

base

342-347' Clay, gravelly

347-359' Clay, brown, sandy

359-375' Clay, with fine gravel

375-380' Clay, sandy 380-397' Sand, firm with soft streaks

397-423' Clay, brown, sticky

423-459' Clay, with streaks of gravel

459-469' Basalt, black

469-474' Sand, gray (blue sand, driller)

474-490' Basalt, dark gray, with some scoriae

490-500' Clay, Ash, with some broken basalt

500'-1000' Clay, Ash

1000'-1025' Sand, Basalt

SAMPLE TYPE:

C = Core

G = Gravels

D = Driller's Log

PROJECT Lower Teton Division - Teton Basin Project  
WELL NO. 4N/38E - 1261 SITE 14  
WELL NO. 4N/38E - 1261 SITE 14

## BUREAU OF RECLAMATION - REGION 1

## LOG OF WELL

Project Lower Teton Division

Feature Exploratory Drill Hole (Piezometers)

State Idaho

Well No. 4N/38E - 1261 (Site 14)

Location H.W.M. Section 12, T. 4 N., R. 38 E., Jefferson County

Total Depth 1026.0 Completed 12/9/69

Drilling Method Diamond Core to 1026'

Static Water Level -

Elevation (ground) -

Yield -

Other Data, Driller, Inspector, and Geologist Reports

Geophysical Log Gamma, Gamma-Gamma, Neutron, Drilled By Justice Core Drilling Co.

Logged By G. I. Hassett

Geophysical Log Gamma, Gamma-Gamma, Neutron, Drilled By Justice Core Drilling Co.

Drillers Name

Depth of Well

Description of Well

Completion

Elev. of Top of Well

Elev. of bottom of well

Water Samples

Description of Well

Condition

0-10' Boulders

10'-20' Gravel

20-50' Gravel

50'-100' Gravel

100'-150' Gravel

150'-190' Gravel

190'-220' Gravel

220'-250' Gravel

250'-280' Gravel

280'-310' Gravel

310'-340' Gravel

340'-375' Gravel

375'-410' Gravel

410'-450' Gravel

450'-490' Gravel

59'-105' CLAY, fine, very fine

105'-150' CLAY, fine

150'-200' CLAY, fine

200'-250' CLAY, fine

250'-300' CLAY, fine

300'-350' CLAY, fine

350'-400' CLAY, fine

400'-450' CLAY, fine

450'-500' CLAY, fine

500'-550' CLAY, fine

550'-600' CLAY, fine

600'-650' CLAY, fine

650'-700' CLAY, fine

700'-750' CLAY, fine

750'-800' CLAY, fine

800'-850' CLAY, fine

850'-900' CLAY, fine

900'-950' CLAY, fine

950'-1000' CLAY, fine

1000'-1025' CLAY, fine

1025'-1060' CLAY, fine

1060'-1100' CLAY, fine

1100'-1140' CLAY, fine

1140'-1180' CLAY, fine

1180'-1220' CLAY, fine

1220'-1261' CLAY, fine

## Sheet 2 OF 2 Rigby Area

## LOG OF WELL

Project Lower Teton Division

Feature Exploratory Drill Hole (Piezometers)

State Idaho

Well No. 4N/38E - 1261 (Site 14)

Location H.W.M. Section 12, T. 4 N., R. 38 E., Jefferson County

Total Depth 1026.0 Completed 12/9/69

Drilling Method Diamond Core to 1026'

Static Water Level -

Elevation (ground) -

Yield -

Other Data, Driller, Inspector, and Geologist Reports

Geophysical Log Gamma, Gamma-Gamma, Neutron, Drilled By Justice Core Drilling Co.

Logged By G. I. Hassett

Geophysical Log Gamma, Gamma-Gamma, Neutron, Drilled By Justice Core Drilling Co.

Drillers Name

Depth of Well

Description of Well

Completion

Elev. of Top of Well

Elev. of bottom of well

Water Samples

Description of Well

Condition

0-10' Boulders

10'-20' Gravel

20-50' Gravel

50'-100' Gravel

100'-150' Gravel

150'-200' Gravel

200'-250' Gravel

250'-300' Gravel

300'-350' Gravel

350'-400' Gravel

400'-450' Gravel

450'-500' Gravel

500'-550' Gravel

550'-600' Gravel

600'-650' Gravel

650'-700' Gravel

700'-750' Gravel

750'-800' Gravel

800'-850' Gravel

850'-900' Gravel

900'-950' Gravel

950'-1000' Gravel

1000'-1025' Gravel

1025'-1060' Gravel

1060'-1100' Gravel

1100'-1140' Gravel

1140'-1180' Gravel

1180'-1220' Gravel

1220'-1261' Gravel

## SHEET 2 OF 2 Rigby Area

## LOG OF WELL

Project Lower Teton Division

Feature Exploratory Drill Hole (Piezometers)

State Idaho

Well No. 4N/38E - 1261 (Site 14)

Location H.W.M. Section 12, T. 4 N., R. 38 E., Jefferson County

Total Depth 1026.0 Completed 12/9/69

Drilling Method Diamond Core to 1026'

Static Water Level -

Elevation (ground) -

Yield -

Other Data, Driller, Inspector, and Geologist Reports

Geophysical Log Gamma, Gamma-Gamma, Neutron, Drilled By Justice Core Drilling Co.

Logged By G. I. Hassett

Geophysical Log Gamma, Gamma-Gamma, Neutron, Drilled By Justice Core Drilling Co.

Drillers Name

Depth of Well

Description of Well

Completion

Elev. of Top of Well

Elev. of bottom of well

Water Samples

Description of Well

Condition

0-10' Boulders

10'-20' Gravel

20-50' Gravel

50'-100' Gravel

100'-150' Gravel

150'-200' Gravel

200'-250' Gravel

250'-300' Gravel

300'-350' Gravel

350'-400' Gravel

400'-450' Gravel

450'-500' Gravel

500'-550' Gravel

550'-600' Gravel

600'-650' Gravel

650'-700' Gravel

700'-750' Gravel

750'-800' Gravel

800'-850' Gravel

850'-900' Gravel

900'-950' Gravel

950'-1000' Gravel

1000'-1025' Gravel

1025'-1060' Gravel

1060'-1100' Gravel

1100'-1140' Gravel

1140'-1180' Gravel

1180'-1220' Gravel

1220'-1261' Gravel

## SHEET 2 OF 2 Rigby Area

## LOG OF WELL

Project Lower Teton Division

Feature Exploratory Drill Hole (Piezometers)

State Idaho

Well No. 4N/38E - 1261 (Site 14)

Location H.W.M. Section 12, T. 4 N., R. 38 E., Jefferson County

Total Depth 1026.0 Completed 12/9/69

Drilling Method Diamond Core to 1026'

Static Water Level -

Elevation (ground) -

Yield -

Other Data, Driller, Inspector, and Geologist Reports

Geophysical Log Gamma, Gamma-Gamma, Neutron, Drilled By Justice Core Drilling Co.

Logged By G. I. Hassett

Geophysical Log Gamma, Gamma-Gamma, Neutron, Drilled By Justice Core Drilling Co.

Drillers Name

Depth of Well

Description of Well

Completion

Elev. of Top of Well

Elev. of bottom of well

Water Samples

Description of Well

Condition

0-10' Boulders

10'-20' Gravel

20-50' Gravel

50'-100' Gravel

100'-150' Gravel

150'-200' Gravel

200'-250' Gravel

250'-300' Gravel

300'-350' Gravel

350'-400' Gravel

400'-450' Gravel

450'-500' Gravel

500'-550' Gravel

550'-600' Gravel

600'-650' Gravel

650'-700' Gravel

700'-750' Gravel

750'-800' Gravel

800'-850' Gravel

850'-900' Gravel

900'-950' Gravel

950'-1000' Gravel

1000'-1025' Gravel

1025'-1060' Gravel

1060'-1100' Gravel

1100'-1140' Gravel

1140'-1180' Gravel

1180'-1220' Gravel

1220'-1261

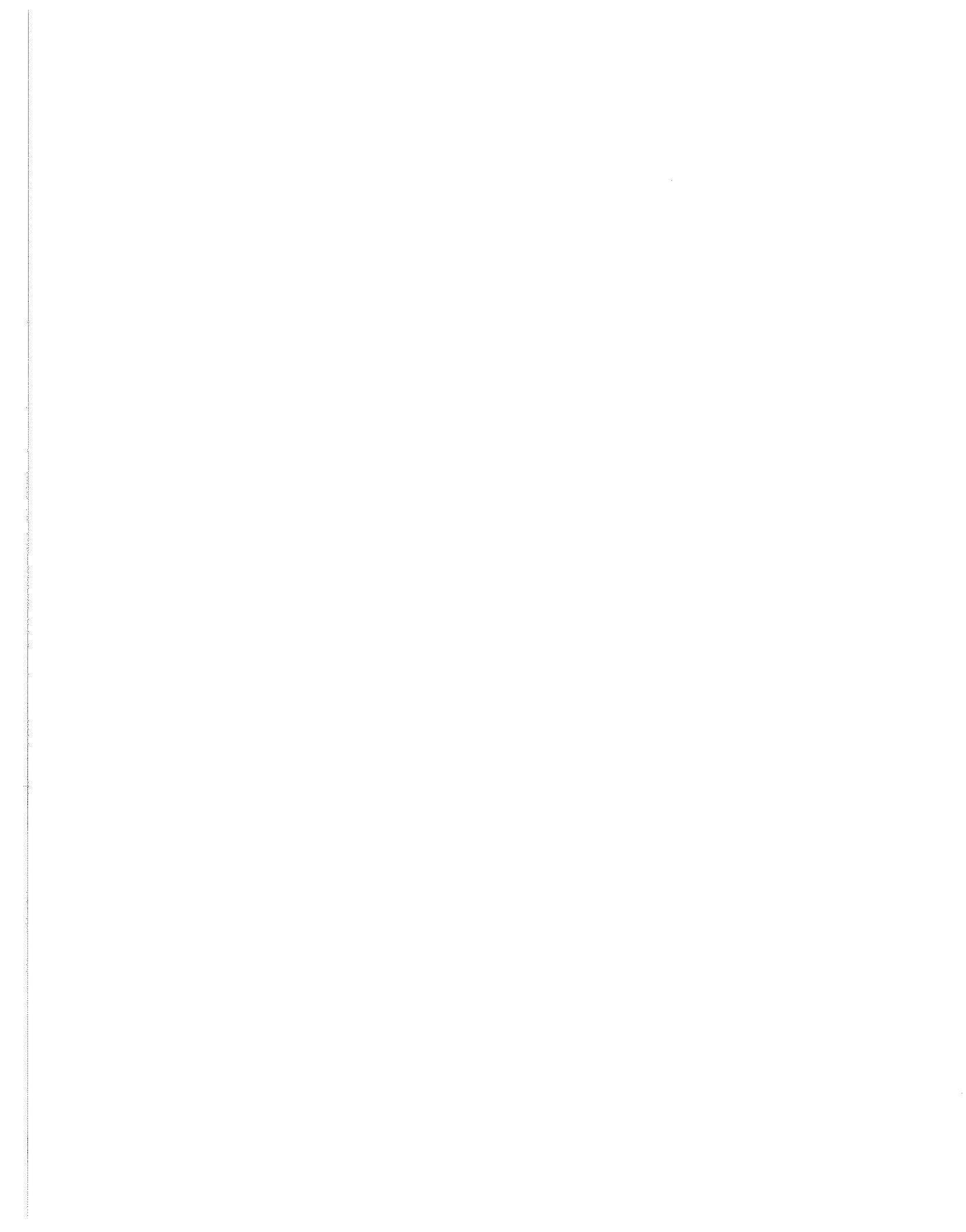
LOG OF WEI I

Project	Snake Plain Recharge	Feature	Exploration Drill Hole - Deepen Hwy. #1	State	Idaho
Well No.	2R 15 E 2bh	Location	sec. 2, T. 2 N., R. 35 E., Bonneville County		
Total Depth	1302.0'	Began	7/1/69	Completed	7/25/69
Static Water Level	\$177.0'	(below)	Moss. Pt.	Top Cracks	Drill
Elevation (ground)	5089.83'	(below)	W.L. Meas.	Feet (above)	Ground
Yield	No test	Dropdown	---	Geologist's detailed top soil, drift, fog, and ground water levels.	Core Drills
Logged By	L. Hampton G. Klink	Geophysical Log	Other Data	Geological, seismic, and bathymetric logs.	Date
Drilling Data	Description	Well Diameter	Log	Classification and Physical Condition	
Water Samples	Completion	ft.	ft.	ft.	
	Well was drilled for the Idaho State Hwy. Dept. 0.0 to 679.0'; 679.0'-1302.0' suspended by core sampler.	Hole size 10"	10' to 679.0'	0 D 0.0' to 10.0' - SOIL.	
	Piezometer N° 3091-01. Three 1/4" I.D. H.I. piezometers inserted into the well as shown below; 5 of perforations begin above bottom of each pipe.	10"	679.0' to 1302.0'	0 D 0.0' to 24.0' - BASALT; gray.	
				0 D 24.0' to 43.0' - CINDER; loose.	
				0 D 43.0' to 45.0' - BASALT; gray.	
				0 D 45.0' to 103.0' - CINDER.	
				0 D 103.0' to 162.0' - BASALT; red to gray.	
				0 D 162.0' to 105.0' - CINDER; ash.	
				0 D 105.0' to 162.0' - BASALT; gray to black.	

42

100 OF WELL





**PART 2**

**OBSERVATION WELLS SOUTH OF ARCO  
AND WEST OF ABERDEEN**



## PREFACE

The Snake Plain aquifer, as defined by Mundorff, Crosthwaite, and Kilburn (1964, p. 142), is a series of basalt flows and intercalated pyroclastic and sedimentary materials that underlies the Snake River Plain east of Bliss (fig. 1). The aquifer is about 9,500 square miles in areal extent and is one of the largest-yielding aquifers in the United States. Approximately 6½-million acre-feet of water is recharged annually to this aquifer by seepage loss from the Snake River and its tributaries, by underflow from tributary valleys, by the downward percolation of water applied for irrigation, and by precipitation on the Plain. Water is discharged from the aquifer through springs and by pumping for irrigation, municipal, industrial, stock, and domestic use. Although the aquifer has been extensively studied and its general extent and properties are known, it is so large and thick that data on the distribution of the basalt flows and interbedded sedimentary deposits that control the movement of ground water have not been obtained at several places of great current importance. Also, there are large areas where the position of the water table and the potential yield of the aquifer are not known.

The objectives of this investigation are to obtain (1) information descriptive of elevations and fluctuations of the water table, water-table gradients, and the distribution of transmissivity, in areas of the Snake Plain aquifer where data are lacking; (2) details of stratigraphic and hydrologic properties at localities selected as being suitable for pumping large quantities of ground water in exchange for surface water<sup>1</sup>; (3) hydrologic details in the eastern part of this aquifer, where the greatest amount of recharge occurs, so as to interpret better the distribution of recharge to spring discharge areas; and (4) water-level and stratigraphic data in the area of the Mud Lake-Market Lake barrier so as to better define recharge relations and large water-level differentials occurring in and around this barrier. In addition, it is expected that all the data collected will be integrated into an existing analog model of the Snake Plain aquifer so that the long-term effects of development of the aquifer can be better predicted.

The Idaho Department of Water Administration has the responsibility of administering the water resources of Idaho, and for this reason it is vitally interested in basic data descriptive of the water resources of the Snake River Plain. Because the U. S. Bureau of Reclamation is actively developing the water resources available in various parts of the Plain, it needs basic data which will be useful in selecting areas suitable for development and in evaluating effects of development. The U. S. Geological Survey has a responsibility for collecting basic data and for appraising the water resources of Idaho. Because of their common interests, and in recognition of the need for information about the water resources of the Snake Plain aquifer, these three agencies entered into a cooperative agreement whereby the U. S. Geological Survey and the U. S. Bureau of Reclamation would initiate, in

---

<sup>1</sup> The U. S. Bureau of Reclamation is investigating the feasibility of diverting surface water from presently irrigated land to areas of inadequate surface-water supply or areas of no surface-water supply and replacing the diverted surface water with ground water.

July 1969, a 4-year project whose goal is to satisfy the objectives described above.

To provide for timely release of the data collected during this 4-year project, it is planned that a series of reports describing the work accomplished during each phase of the project will be prepared. The Mud Lake region was discussed in part 1 of this report series. The present report (part 2) concentrates attention on an area farther southwest, where the hydrologic environment and problems are different. Part 2 presents (1) water-level and lithologic data obtained from drilling three observation wells (2N-26E-22dda1, 1S-27E-14dcc1, and 5S-28E-26bbd1) and deepening another well (3N-26E-22aba1) on the Snake River Plain south of Arco and west of Aberdeen and (2) a revision of a local part of the existing regional water-level contour map.

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A PROGRESS REPORT ON  
RESULTS OF TEST-DRILLING AND GROUND-WATER INVESTIGATIONS  
OF THE SNAKE PLAIN AQUIFER, SOUTHEASTERN IDAHO

Part 2

Observation Wells South of Arco  
and West of Aberdeen

By E. G. Crosthwaite

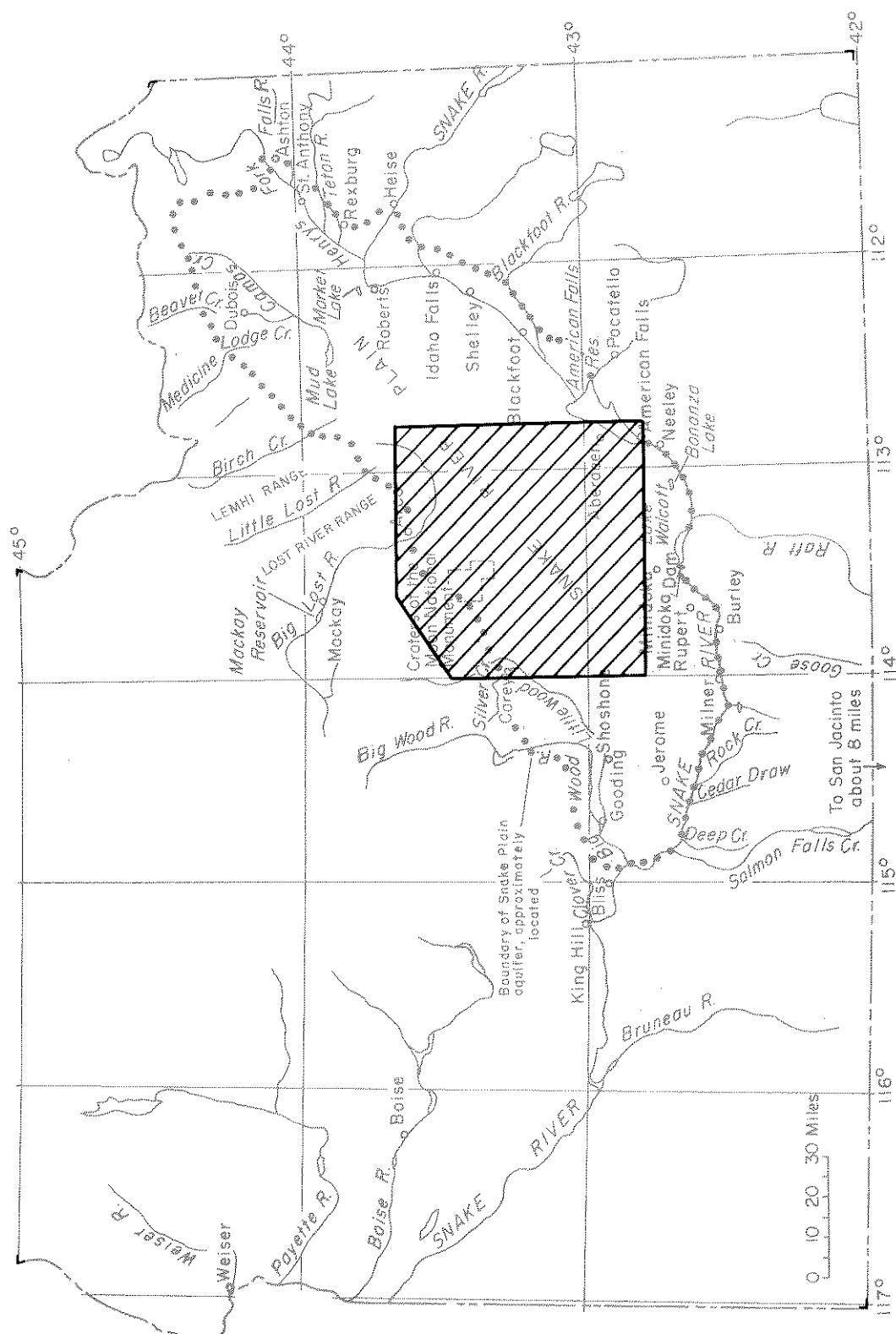
ABSTRACT

Three wells were drilled and another well deepened in a part of the Snake River Plain where geologic and hydrologic data are sparse. Most of the material drilled was basalt with a few thin interbedded fine-grained sedimentary deposits. The sediments increase in thickness and coarseness near the mouth of the Big Lost River basin. The water-level data obtained from the wells indicate that the water-table gradient is relatively steep between Arco and American Falls and that the gradient is relatively low southwest of the area of steep gradient. The new data generated in this study permit a significant revision of previous water-level contour maps.

The reason for the steep gradient is not clear, but the water table may be influenced by a rift zone which is visible more than three fourths of the way across the Plain from the Craters of the Moon National Monument; by a change in thickness of the aquifer caused by a ridge representing a buried north-south trending mountain range; by a significant thickening of basalt filling an erosional basin immediately downgradient from the steepened gradient; or by a fault in the underlying basalt whose trace has been obliterated by younger flows.

INTRODUCTION

Three wells drilled for this phase of the project are in line 5, 12, and 25 miles south of Arco; the fourth is 18 miles west of Aberdeen; all are in the north-central part of the Snake River Plain in southern Idaho (fig. 3). The Snake River Plain, a broad, rolling plain extending from Bliss eastward and northeastward to Ashton (fig. 1), is underlain chiefly by basaltic lava flows. Domes, craters, and cinder cones are scattered throughout the Plain and mark centers of past volcanic activity. The total thickness of the basaltic flows is unknown, but wells and geophysical data indicate that the basalt is more than 2,000 feet thick. From



**FIGURE 1.** Map of southern Idaho showing the Snake River Plain and area covered by this report.

Arco southward toward Minidoka and southwestward toward Carey, wells are scarce and, therefore, even the approximate position of the water table in this area has been but poorly defined. The drilling described herein was accomplished to better define the position of the water table in this part of the Plain and to collect hydrologic information descriptive of hydrogeologic conditions at the margin of the Plain where a large mountain basin (Big Lost River basin) is tributary to the Plain.

### Well-Numbering System

The well-numbering system used by the U. S. Geological Survey in Idaho indicates the location of wells within the official rectangular subdivision of the public lands, with reference to the Boise base line and meridian. The first two segments of the number designate the township and range. The third segment gives the section number, followed by three letters and a numeral, which indicate the quarter section, the 40-acre tract, the 10-acre tract, and the serial number of the well within the tract, respectively. Quarter sections are lettered a, b, c, and d in counterclockwise order from the northeast quarter of each section (fig. 2). Within the quarter sections, 40-acre and 10-acre tracts are lettered in the same manner. Well 2N-26E-22dda1 is in the NE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$  sec. 22, T. 2 N., R. 26 E., and was the first well inventoried in that tract.

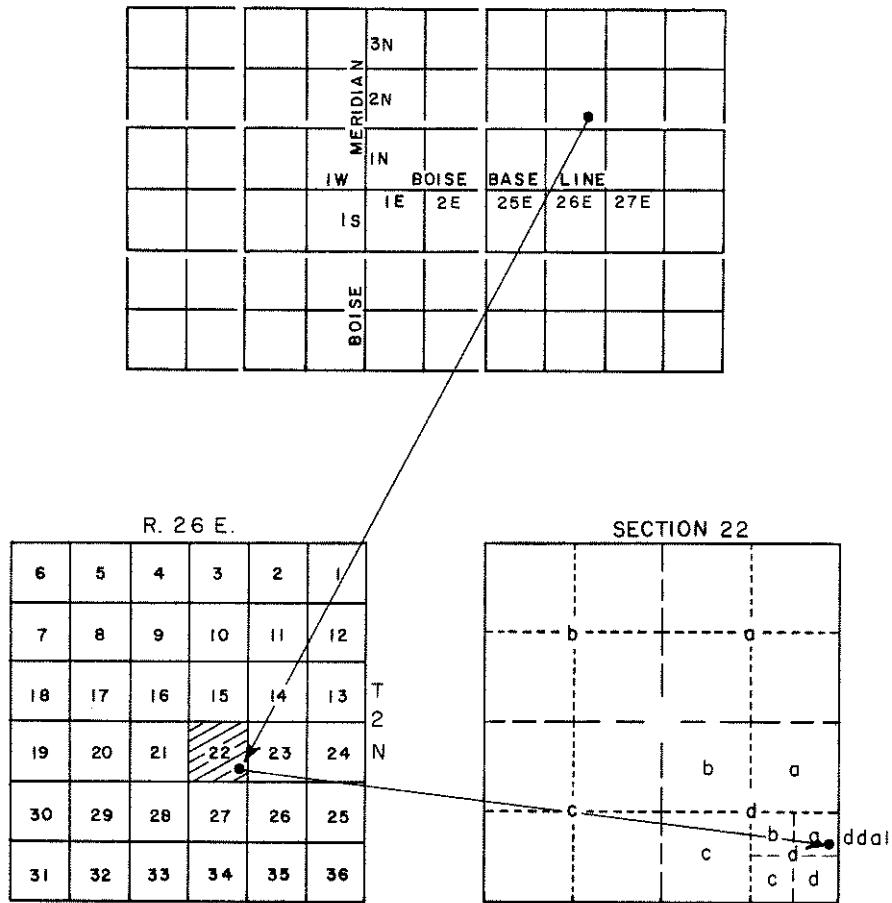
## RESULTS OF DRILLING

### Well 3N-26E-22aba1

Well 3N-26E-22aba1 (fig. 3) was originally drilled to a depth of 819 feet and, when completed in 1966, had a perched water level of 585 feet below land surface. While this well was being constructed, the driller reported that perched water also occurred at depths of 275 and 445 feet. As a part of this project, the well was deepened to 1,075 feet in 1970 and a 4-inch casing was grouted at 970 feet leaving the bottom 105 feet of the well open to basalt, sand, and gravel. The water level in the deepened well was at 793 feet below land surface on September 17, 1970, and is representative of the water table in the Snake Plain aquifer at this location. As shown in figure 4, illustrating lithologic and geophysical logs, a total of eight zones of basalt, each separated by layers of clay, sand, and gravel, were penetrated in drilling the well.

### Well 2N-26E-22dda1

Well 2N-26E-22dda1 (fig. 3) was drilled to a depth of 1,053 feet and cased with 6-inch casing to a depth of 728 feet. The well is uncased from 728 to 1,053 feet. Perched water was found in clean sand and gravel at a depth of 664 feet below land surface. The perching layer is a clay bed from 720 to 728 feet. The only other sediments found in drilling were a



**FIGURE 2.** Diagram showing well-numbering system.  
(Using well 2N-26-22dda1.)

3-foot bed of silt and clay at 186 feet and another 5-foot bed at 412 feet. No perched water was found above or in these beds. The regional water table is at a depth of 980 feet below land surface.

#### Well 1S-27E-14dcc1

Well 1S-27E-14dcc1 (fig. 3) was drilled to a depth of 1,041 feet and cased with 4-inch casing to 1,031 feet. A 4-foot bed of baked silt and clay was found at 790 feet, an 8-foot bed of baked red sand at 988 feet, and a fine red sand bed at 1,033 to 1,041 feet. The regional water table is 995 feet below land surface. No perched water was found in this well.

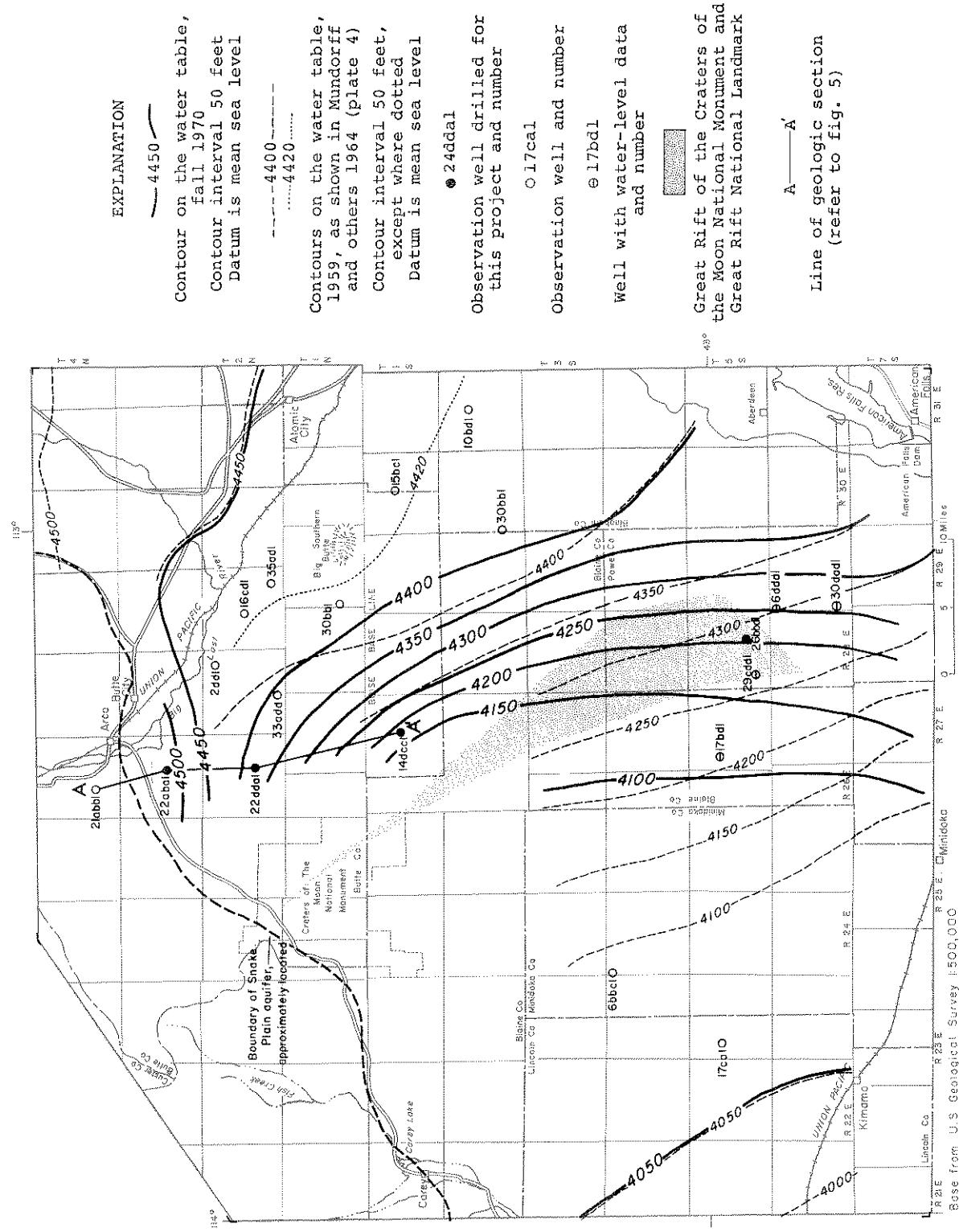


FIGURE 3. Map showing contours on the water table and location of wells in area covered by Part 2.

## **Well 5S-28E-26bbd1**

Well 5S-28E-26bbd1 (fig. 3) was drilled to a depth of 763.5 feet and cased with 4-inch casing. Although a small amount of water was found at approximately 670 feet, the regional water level is taken to be 680 feet below land surface.

## **EVALUATION OF DATA**

### **Revision of Water-Level Contour Map**

In the past, insufficient data were available to define adequately the position of the water table in that area of the Snake River Plain encompassed by a line connecting the towns of Carey, Arco, Aberdeen, and Minidoka. The configuration of the water table in this part of the Plain, as interpreted by Mundorff, Crosthwaite, and Kilburn (1964, pl. 4) on the basis of data available at that time, is shown in figure 3. Although a few stock wells have been drilled in this part of the Plain since 1964, wells from which water-level measurements can be obtained are still sparse. Water-level measurements in observation wells drilled for this study, and a few recently available water levels in other wells, permitted revision of the previous water-level contour map. The two interpretations are shown in figure 3. Southwest of the 4,050-foot contour and northeast of the 4,420-foot contour, well data are adequate to define the position of the water table with a reasonable degree of confidence. As can be noted in figure 3, the contours from 4,100 to 4,400 feet, inclusive, have been shifted eastward and northeastward resulting in a map with a very low water-table gradient between the 4,050 and 4,100-foot contours and a much steeper gradient between the 4,100 and 4,400-foot contours. Except immediately south of Arco, the gradient is very low northeast of the 4,400-foot contour. As more observation wells are drilled and more water-level data become available, further revision of the water-level contour map may be required.

### **Evaluation of Hydrologic Data**

As noted previously, perched water was found in well 2N-26E-22dda1 and several perched water-bearing zones were found in well 3N-26E-22aba1. These wells and well 1S-27E-14dcc1 are shown in the geologic section (fig. 5). In addition, a test well (4N-26E-21abb1), drilled in 1969, 4 miles northwest of Arco is shown (Crosthwaite and others, 1970, p. 72, fig. 25). The geologic section shows the geologic and hydrologic conditions southward from the mouth of the Big Lost River basin, a major valley tributary to the Snake River Plain. Water was encountered at successively greater depths in wells 4N-26E-21aba1 and 3N-26E-22aba1 as the wells were drilled and cased during construction. Thus, the water levels shown by triangles on the geologic section are the water levels when the bore hole was open between the bottom of the casing and the bottom of the hole. The lowermost triangle shows the water level in the completed well. Well 3N-26E-22aba1 was constructed so as to penetrate saturated basalt, sand, and gravel which are several tens of

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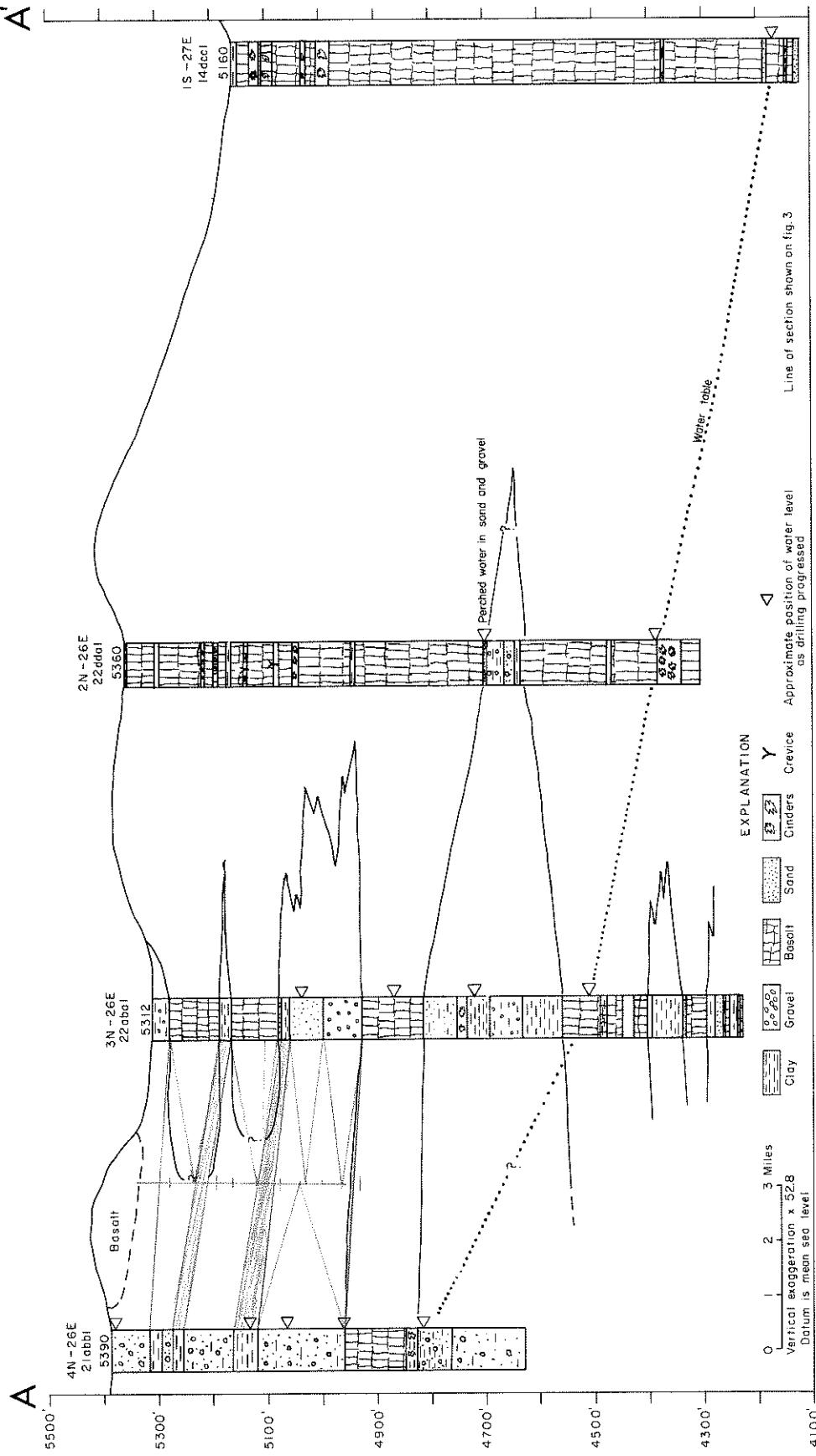


FIGURE 5. Geologic section through observation wells near Arco.

feet below the elevation of the water table in the Snake Plain aquifer several miles to the south. Thus, the water levels in the well should be representative of the water level in the main aquifer.

The water-level contour map shows that ground water is moving to the south and southwest from the Big Lost River basin to the Snake River Plain and that the gradient is relatively steep, on the order of 25 feet per mile. Ground water in the Big Lost River basin moves to the Snake Plain aquifer in several water-bearing zones, separated by less permeable zones which are several hundred feet above the regional water table. As the water percolates downward, these zones become progressively drained until no ground water remains on the perching layers.

The sequence of basalt and sediments at the mouth of the Big Lost River basin is the result of sediment deposition by the Big Lost River alternating with volcanic activity. Lava flows have dammed the river several times and thereby caused it to change its course. The sediments encountered in the drill holes were most likely deposited behind lava dams or laid down in stream channels after the river topped the lava dams. The gravel overlying the clay in well 2N-26E-22dda1 is a typically clean river gravel. Its geographic location implies that the river had a more southerly course than the present one which is southeast, east, and finally northward to the southern end of the Lemhi Range.

The reason for the steep water-table gradient between the 4,150 and 4,400-foot contour is not clear. One possible explanation is its proximity to an extensive fissure or rift zone. The most recent volcanic activity on the Snake River Plain has occurred along the Great Rift in the Craters of the Moon National Monument (Stearns, 1928, p. 6). The Great Rift extends across the Monument in a southeasterly direction from the mountains bordering the Monument on the north and is marked by a double line of cinder cones. To the southeast of the Monument, three major rifts and fissures with several sets of subsidiary fractures can be traced for 25 miles. Buttes and craters occur along the rifts. The Great Rift in the Monument and the rift zone to the southeast are part of a rift system that extends more than three-fourths the distance across the Snake River Plain (fig. 3). The National Park Service, U. S. Department of the Interior, has designated that part of the rift zone outside the Craters of the Moon National Monument as the Great Rift National Landmark. The most spectacular feature of the national landmark is an open rift in the west part of T. 5 S., R. 28 E., and in the northwest part of T. 6 S., R. 28 E. This rift is open for almost 7 miles and is as much as 20 feet wide. The open crack extends to a depth of several hundred feet. Subsidiary cracks which generally parallel the main rift are as much as 8 to 10 inches wide, several hundred yards long, and appear to be several tens of feet deep. As many as half a dozen cracks may occur within a distance of a quarter of a mile. There is no discernible vertical displacement along the fractures or rifts.

The southern part of the Great Rift National Landmark, in the northern part of Power County, almost coincides with the steep gradient of the water table described above and shown in figure 3. Farther north in the area of the steep water-table gradient there is no

surface evidence of a rift. The available evidence could be interpreted to indicate that a buried rift system is the cause of the steep gradient; however, other factors could produce the same effect. For example, the saturated thickness of basalt may be greater both upgradient and downgradient from the area of the steep water-table gradient. This change in thickness could be caused by a ridge representing a buried north-south trending mountain range. Another possible explanation could be a fault in the underlying basalt whose trace has been obliterated by younger flows. Thus, until more evidence is available, the reason for the steep gradient cannot be determined.

## REFERENCES

- Crosthwaite, E. G., Thomas, C. A., and Dyer, K. L., 1970, Water resources in the Big Lost River basin, south-central Idaho: U. S. Geol. Survey open-file report, 109 p., 31 figs.
- Mundorff, M. J., Crosthwaite, E. G., and Kilburn, Chabot, 1964, Ground water for irrigation in the Snake River basin in Idaho: U. S. Geol. Survey Water-Supply Paper 1654, 224 p., 6 pls., 54 figs.
- Stearns, H. T., 1928, Craters of the Moon National Monument, Idaho: Idaho Bur. Mines and Geol. Bull. 13, 57 p., 22 pl.

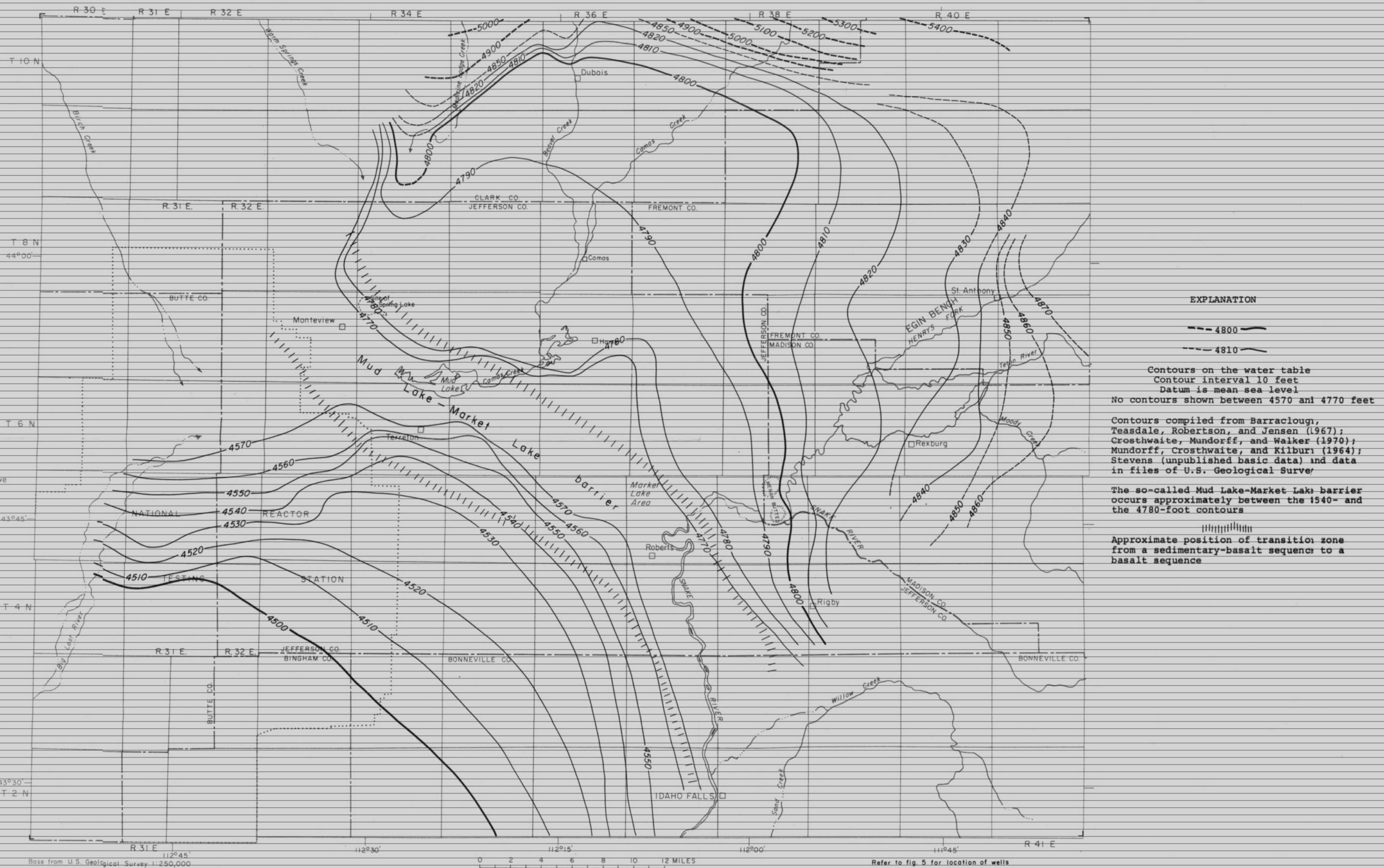


FIGURE 3.--Map showing contours on the water table in the Mud Lake region, Idaho.

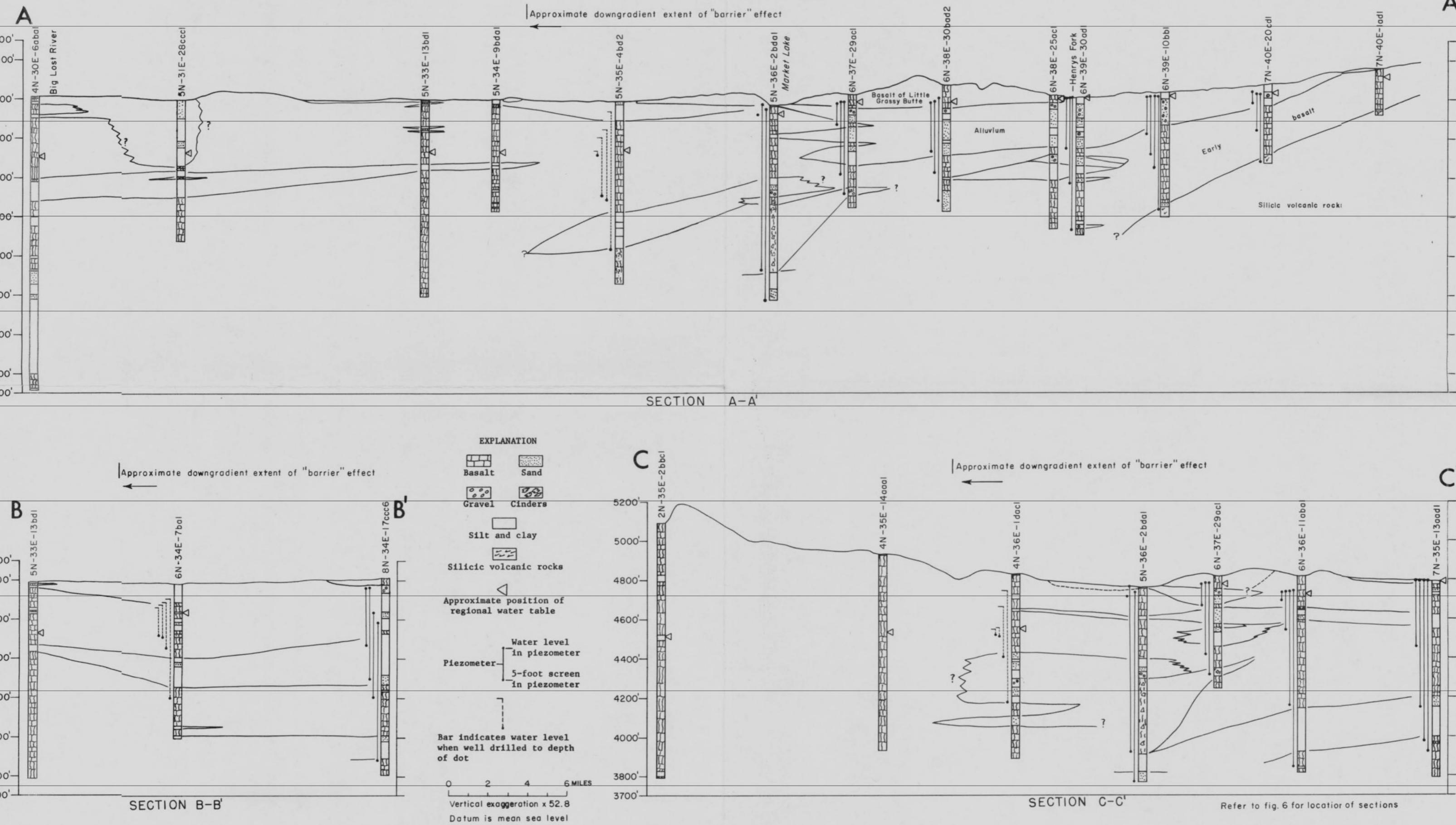


FIGURE 4.--Geologic sections in the Mud Lake region, Idaho.

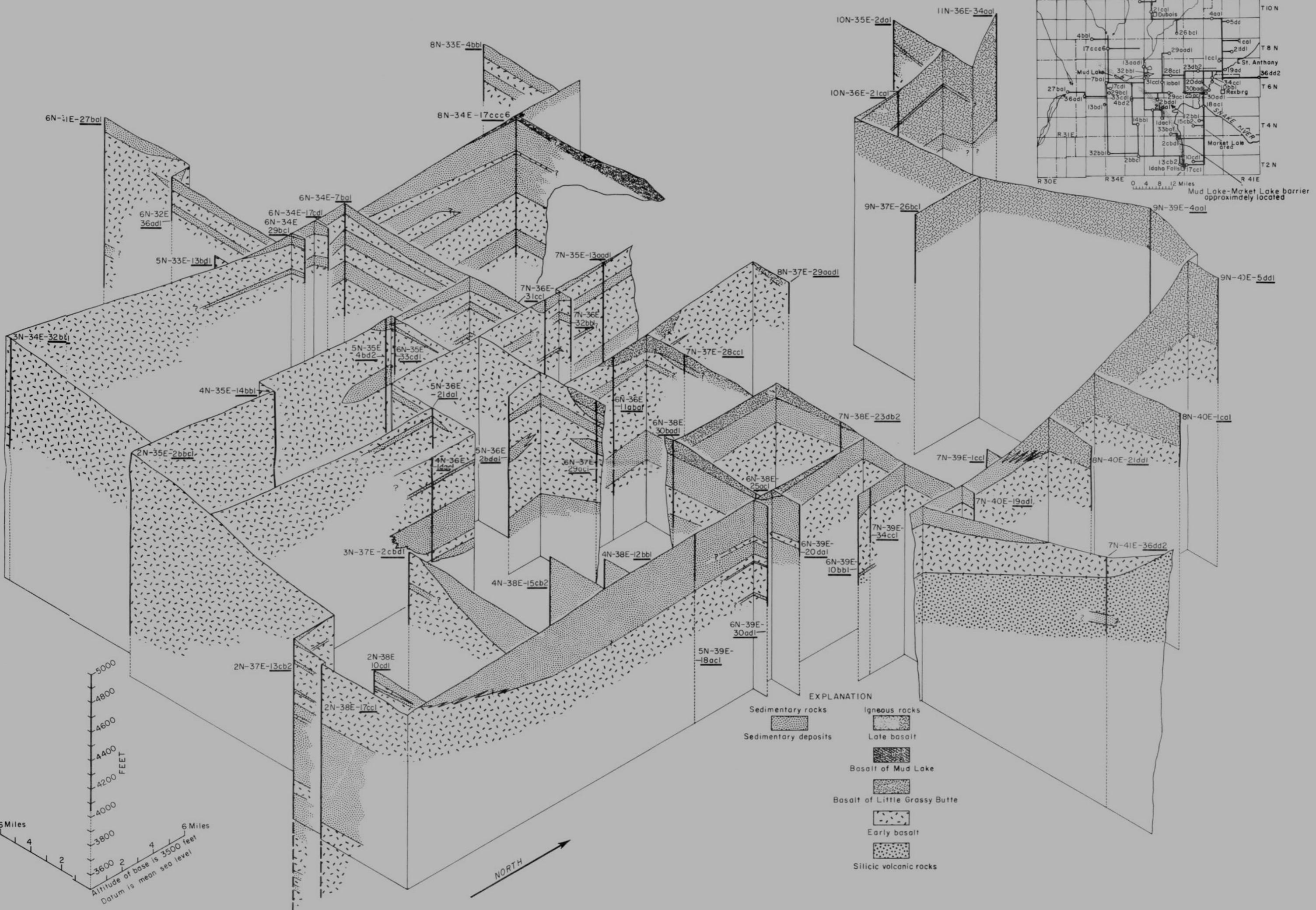
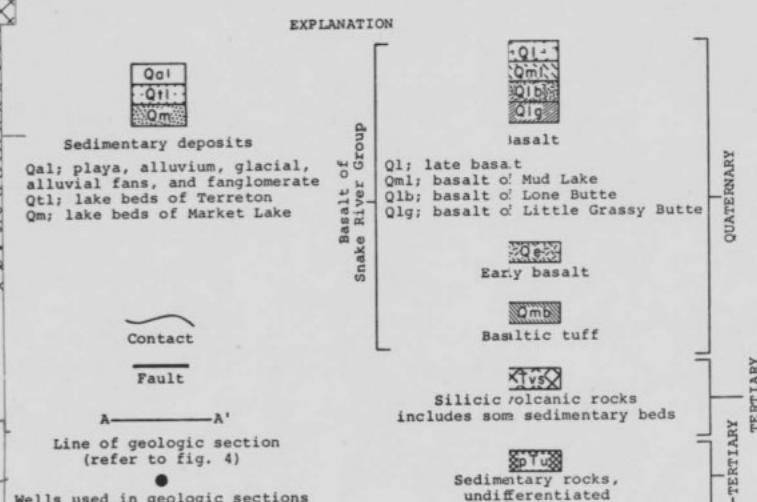
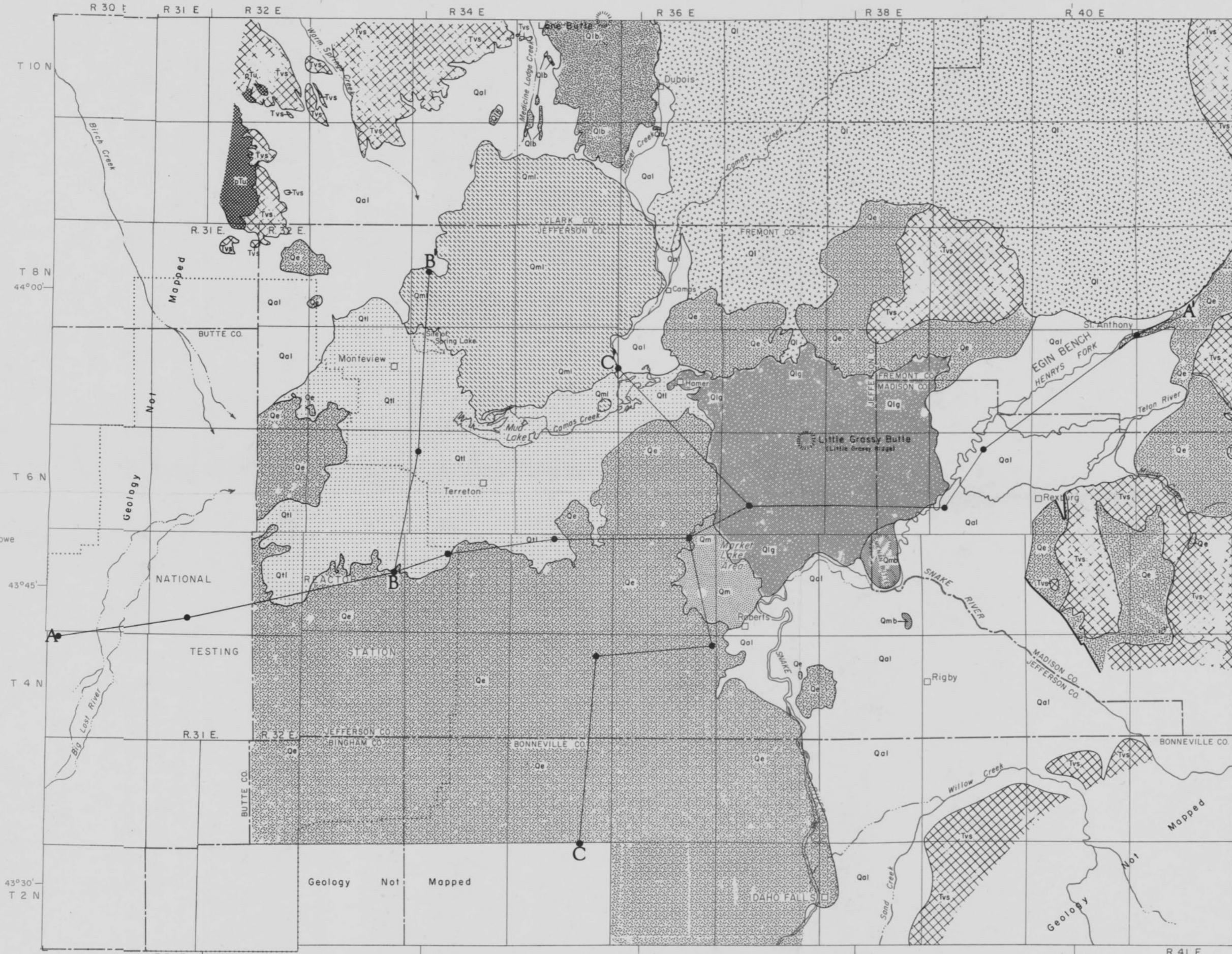


FIGURE 5--Fence diagram showing the subsurface geology in the Mud Lake region, Idaho.

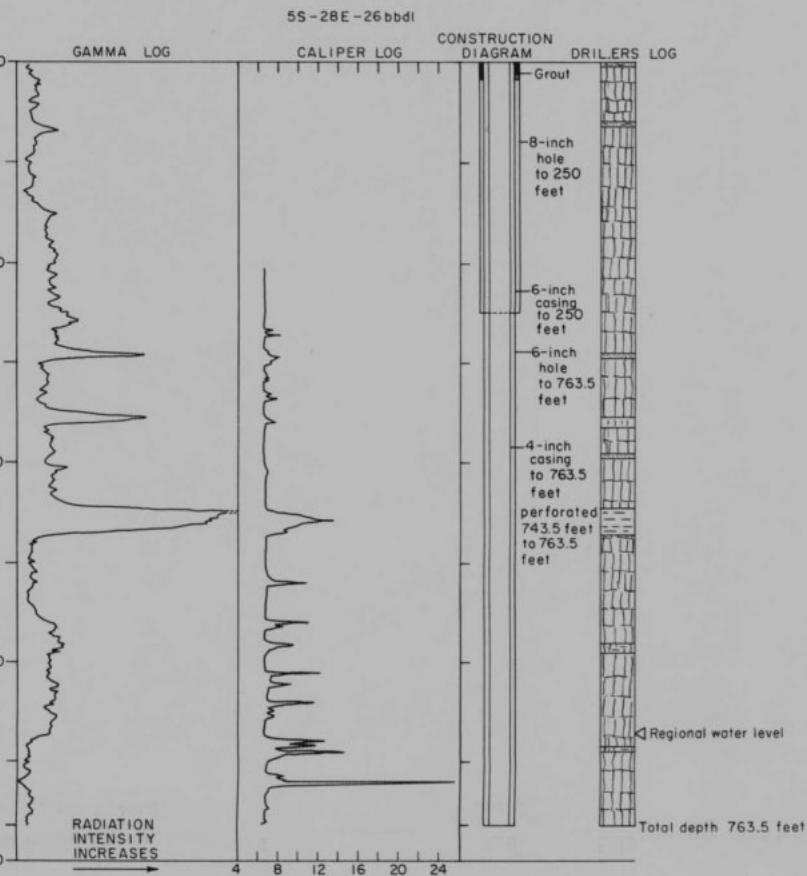
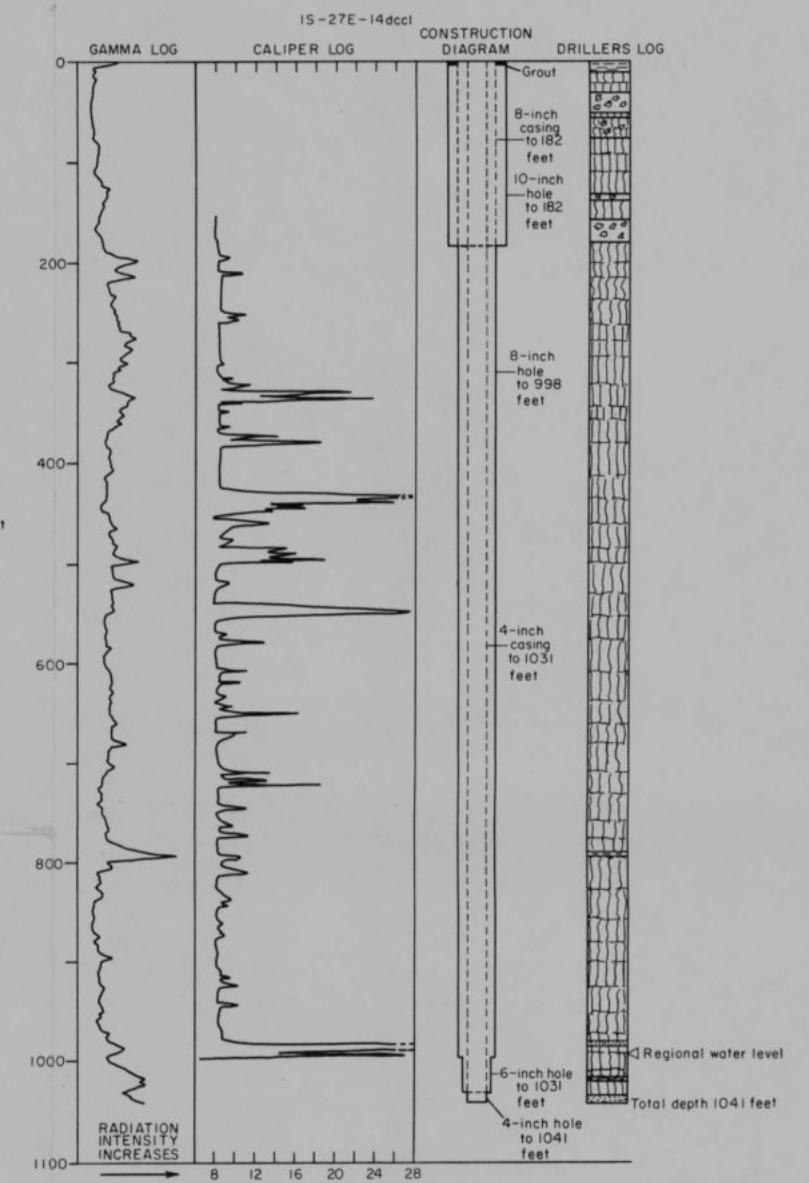
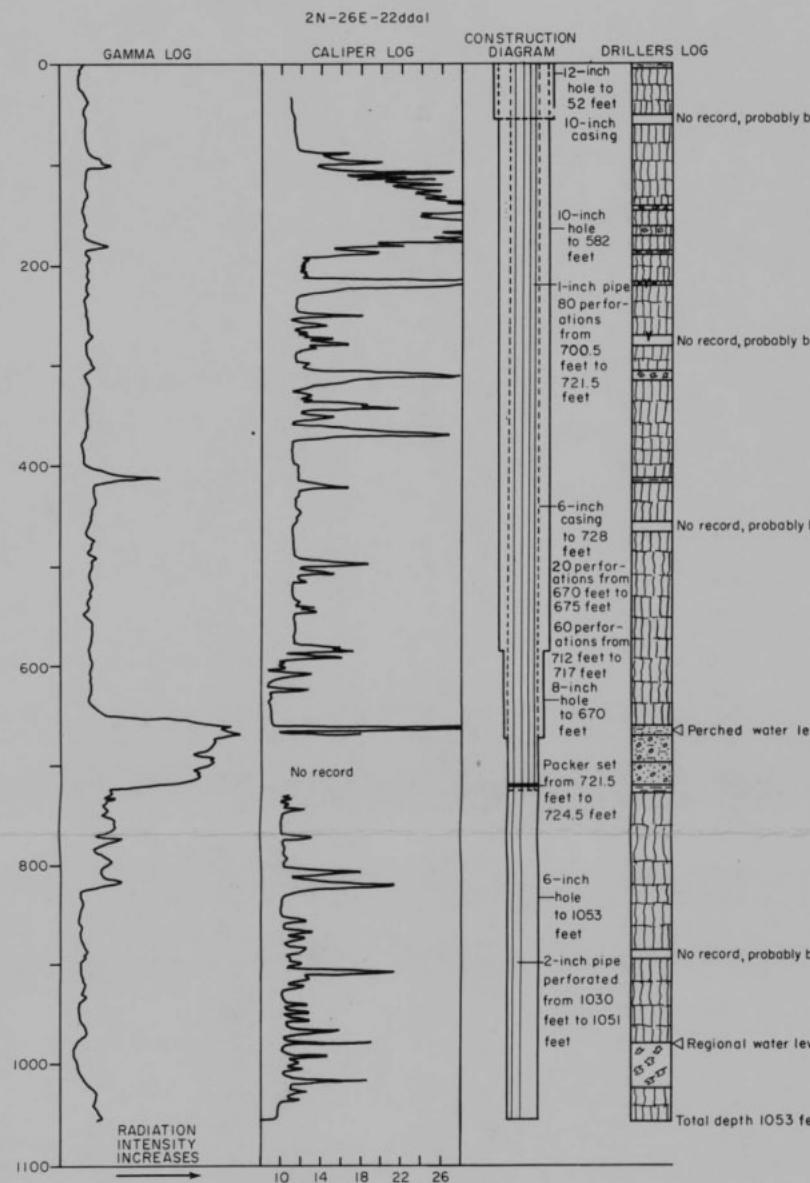
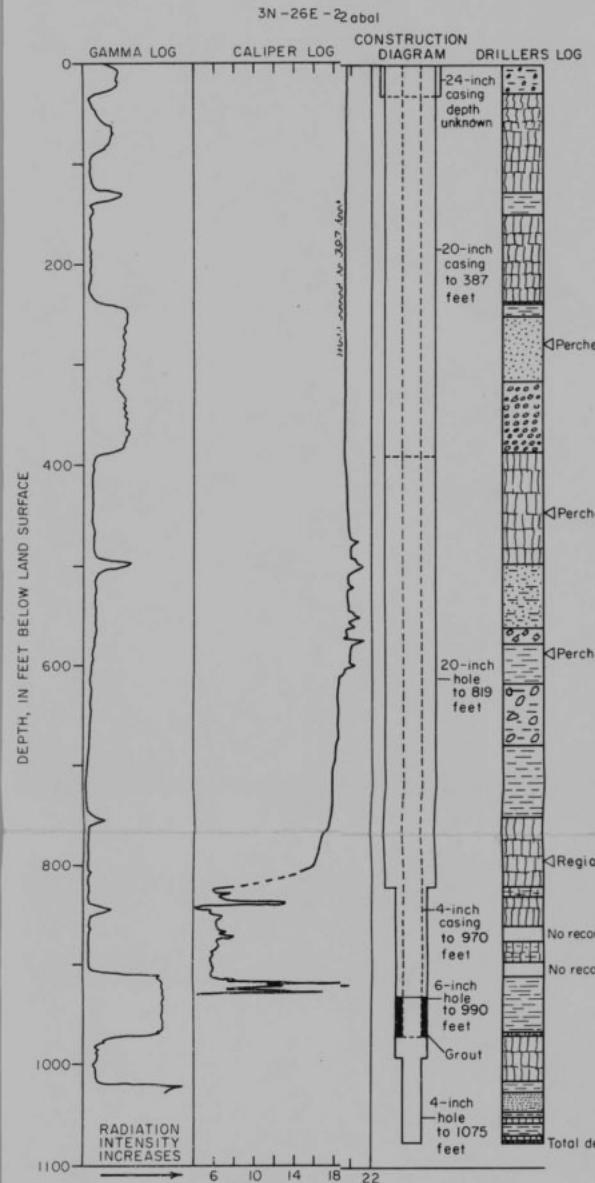


Base from U.S. Geological Survey 1:250,000

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Note:  
Geology from Crosthwaite and others (1970) and from  
unpublished map by P.R. Stevens

FIGURE 6.--Generalized geologic map of the Mud Lake region, Idaho.



EXPLANATION

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